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The Pectin Controversy.

AS A MEASURE against the manufacture of inferior jams with which the market was steadily flooded, recent legislation in Germany laid down a maximum pectin content of ·3 per cent. in jam.

This was, of course, a measure of some protection to the manufacturers of high-grade conserves, whose prices could never compete with those of firms with whom quality was not an important consideration, and it would not surprise us if some similar measure were taken in this country. It would probably take the form of enforcing a minimum content of fresh fruit, however, rather than a maximum of added fruit juices—the properties of the latter being, on the whole, too variable.

Of course, every jam manufacturer worth his salt aims at the production of a standard, uniform product. From the point of view of scientific control, this is a very difficult matter. In the first place, the chemist finds that his principal raw material, fruit, is not only variable in quality, but it is unstable, and the chemical changes liable to take place are beyond the range of complete control. Much can be done to promote uniformity of product by plant breeding with the object of the commercial production of fruits best adapted to the industry. In the second place, the chemist is trying to control a highly complex process involving the interplay of many factors, a process the chemistry and physics of which are but imperfectly understood. We are still in the empirical stage of jam making.

Sugar, Acid, Pectin.

It is true that we have some idea of the inner workings of the jam making process, but it is vague and imperfect. Reduced to its simplest elements, it is a question of jam maker's triangle—sugar-acid-pectin.

Sugar gives thickness and body to the product. It preserves the colour, flavour, and general appearance of the fruit, and largely determines the yield. It also reduces the destructive action of yeasts, moulds, etc. It functions with the acid and pectin to give a gel condition, and blends with the acid to bring out the full fruit flavours present.

The acid aids in the inversion of part of the sucrose and in setting the pectin, and balances the sweet taste of the sugar. Tarr has shown that the effect of the acid on the pectin is in direct relation to the hydrogen-ion concentration. It was Tarr, Myers, and Baker, working at the Delaware Agricultural Station, U.S.A., who definitely showed the direct relation existing between the jellying power of pectin and pH values.

Pectin in the fruit cell walls aids in keeping the shape and appearance of the fruit in the preserve. Pectin in solution in the fruit juice sugar syrup aids in thickening the syrup, and is the chemical on which the gel condition primarily depends.

The fruit salts, and perhaps the proteins, resins, etc., serve as buffer agents in slowing down the speed of pectin setting by affecting the hydrogen-ion concentration.

Oxidation in Jams.

The jam industry is just beginning to realise the importance of oxidation as one of the causes of the chemical changes influencing the colour and flavour of fruits and fruit juices, and even of jellies, jams, and preserves. Air entrapped in the head-space of containers exhibits these destructive changes over a period of storage. Thus, the evacuation of this air and its replacement by an inert gas may yet become the commercial practice. Heat accelerates these changes. Thus it comes about that the cardinal principles in preserve and jelly manufacture are a very rapid cook, as low a temperature as possible, a very rapid subsequent cooling, and as short an exposure to the air as is possible. Further, it should be remembered that any destruction of vitamins A and B, and particularly C, is almost entirely due to oxidation.

Vacuum Cooking.

In recent years many factories have installed the vacuum pan method of cooking, which lowers the highest cooking temperature by 60° to 80° F. and to a considerable extent reduces the destructive oxidation losses in colour and flavour during cooking. Also, it appears to promote more complete inpregnation of the fruit by the sugar. The large vacuum pans ordinarily used should be replaced by smaller ones so as to reduce the time of heating.

The gel setting properties of fruit pectin are quickly reduced by high temperatures, combined with long exposure. The lower temperature of the vacuum pan partially arrests this loss by retarding the reaction.

Jam Research.

At the ninth annual general meeting of Crosse and Blackwell, Limited, the Chairman, Mr. J. C. Goff, referring to the fact that this firm had been making changes in oversea markets, remarked that: "The old method of merchandising goods by way of agents in distant countries has become obsolete, and manufacturers in the country find more and more that they are compelled to set up their own organisation to develop their trade in distant countries."

The Chairman stated that his firm had some 2,000 different lines and sizes, and that it was a very big item to alter labels or packages. He then went on to say: "To-day we are second to none in this country in our scientific methods. We have installed, under the control of a very well-known chemist, as fine a research laboratory as it is possible to have. We have a chef of international reputation. The result is that we are getting a more even product—I might call it a more standard product, subject to less variations, less fluctuations—with the result that we have now entirely eliminated the troubles we used to have in the old days when sending goods through the Tropics, and complaints as to variations are practically nil.

Attention was drawn to the necessity for standardisation in both products and methods of production, and it is a matter of great credit to an old business, such as is Crosse and Blackwell, Limited, that they have achieved so much in this direction.

Dried Fruit.

Over 294,000 short tons of dried fruits were exported from U.S.A. during the year 1928. This is a record.

Cruess and Forg, of California, have been investigating the effect of sulphur dioxide on the oxidase of fruits. In order to prevent darkening during drying and subsequent storage, it is customary to subject freshly cut apricots, peaches, pears, and apples to the fumes of burning sulphur. The sulphur dioxide exerts a strong inhibiting action on the darkening by oxidation of the natural colour bases of these fruits in addition to its bleaching action on the anthocyan pigments. Browning of such fruits in the fresh state is caused by oxidation, which in turn is induced by the oxidase of the fruit.

Ice Cream.

Popularising ice-cream in Great Britain has been a slow process, but in the opinion of the United States Trade Commissioner the limit of British consumption of that delicacy has by no means been reached. In an analysis of the United Kingdom as a market for American dairy equipment just issued by the Commerce Department, it is pointed out that ninety-five per cent. of the ice-cream equipment used in that country is estimated to be of American origin. The expansion of the British industry, therefore, is likely to be reflected in the exports of American ice-cream-making machinery.

The cool climate is the chief handicap to increased use of ice-cream in Great Britain, the public still regarding it as a warm weather delicacy. This factor will, of course, diminish in importance when the British public comes to regard ice-cream as an all-year-round food and desert.

Another factor hampering the sale of ice-cream is the fact that large numbers of small ice-cream makers produce what is considered a very inferior article. An association of the larger manufacturers has been trying to get the Government to set a legal standard for the quality of ice-cream. It is only a matter of time, the report states, when a standard will be established and the makers of wholesome ice-cream protected from the competition of inferior grades.

Only a few British manufacturers of ice-cream sell under their own brands as in the United States. The largest manufacturer in the country, however, the Lyons company, is an outstanding exception. This company, which owns and operates about four hundred shops and restaurants, has induced retailers to sell ice-cream under the company's brand. In order to bring this about cabinets have been supplied to the retailers and the brand extensively advertised. Some manufacturers who sell direct to the retailers have adopted a unique method of distribution, operating fleets of tricycles equipped to permit street vending and house-to-house canvassing. One manufacturer alone is said to operate nearly 1,200 of these tricycles.

As in the United States, the soda fountain trade in Great Britain provides an important outlet for ice-cream. However, there is much room for improvement in the service from these fountains. The ice-cream served as a rule is considered too soft, resulting from the fact that British ice-cream makers experience difficulty in securing adequate supplies of

cream and are compelled to use more butter and milk powder than American manufacturers.

Research in Dairying.

Recently we passed several pleasant and instructive hours with Professor Stenhouse Williams at the National Institute for Research in Dairying. This institute is situated at Shinfield, some three miles from Reading. Its rapid growth since its inception in 1912 is little short of amazing. Started in a couple of back rooms in Reading, without farm or dairy, and two scientists and an assistant, it has expanded into a large building of its own, with a farm of 400 acres, farm buildings, a dairy herd, and a staff of twenty-five scientific workers and a dozen assistants. All this has been achieved by the unstinted energy and enthusiasm of Professor Williams, and we wish him equal success in the future.

The funds which have made this growth possible have come partly from the Ministry of Agriculture, partly from the trade, and partly from the Empire Marketing Board.

We came away with twenty pamphlets recording some of the work that has been carried out at the institute; all these, such as "Can the Ordinary Farmer Produce Clean Milk?" "Pasteurisation and the Tubercle Bacillus," "Bacterial Content and the Keeping Quality of Milk," "Raw Milk," "Breeding Records for a Dairy Herd," "Graded Milk," and "The Deterioration of the Oils of Feeding Stuffs," are of direct practical interest. It is gratifying to learn that no firm, whether contributor to the funds or not, is refused information, and that the results of research are published in the colonies. Recently, one of the staff went to Ireland to carry out dairy bacteriological work, and two others have gone out to New Zealand to start an institute there.

Captain J. Golding, head of the chemical department, is at present engaged upon some particularly interesting work on pigs. So far as this work has gone it would appear that the incorporation of soya bean in the dietary is attended with advantages; the daily addition of half a pint of milk led to a 10 per cent. improvement in general health. Interesting experiments are being made with ground nuts. Another line of work which promises remarkable results is concerned with vitamins.

Keeping Cream.

The researches that have been carried out and those that are in progress are too numerous to mention. These are summarised in a descriptive booklet of the institute and in the annual reports. We should, however, like to draw special attention to the investigations on the keeping quality of cream without preservatives and on the blue mould of Stilton cheese.

A preliminary experiment has been carried out with the idea of determining the difference in keeping quality of cream from various sources under varying conditions of manufacture. The result of this preliminary experiment shows that cream obtained from clean milk has very good keeping quality, about equal to that of the milk from which it was separated. When cream which has been obtained from ordinary milk is pasteurised the length of time during which it remains sweet is approximately double that of the same cream unpasteurised. Cream when kept constantly in cold store remains sweet some considerable time, but quickly deteriorates when brought into ordinary temperatures. During the winter, with naturally low temperatures, there will be no trouble in keeping cream, but in the summer it will be necessary to devise methods of storage and delivery so as to maintain a constant low temperature. This experiment will be continued and extended during the year. The influence of sterilising the separator upon the duration of sweetness of the cream is also being studied.

Stilton Cheese.

Investigations have been carried out at Shinfield upon the influence of various factors on the spore production (blueing) of the mould of Stilton cheese. These experiments show that the nature of the nutrient supplied may exert a marked influence on the type of growth. For instance, when saccharose is added to a nutrient solution containing only mineral constituents, a luxuriant growth results with prolific spore production, but the addition of lactose gives rise to a lighter and less abundant growth, and the blue-green colour of the spores rapidly changes to greyish green. Again, growth is good and the spores retain their bright blue-green colour when lactic acid is added in a proportion which does not exceed 2 per cent. Other nutrients, especially those which might occur in Stilton cheese, are under investigation.

I.C.I. Research.

The Agricultural Research Station of Nitram, Limited, the distributing and research organisation for the farm fertilisers side of Imperial Chemicals Industries, is the finest of its kind in the world. The station is equipped with laboratories for the examination of soil and fertilisers and for research into such subjects as animal nutrition, biochemistry, plant physiology, bacteriology, and general microbiology. There is also a photographic dark room, a sterilising room, a machinery and preparation room, and, of course, a library. The station, which is at Warfield, Berkshire, comprises two adjoining farms—Jealott's Hill and Nuptown. The former has an area of nearly 400 acres, of which 160 are arable, while the latter—a grass holding—is 76 acres in extent.

Farmers and Research.

Ninety years ago John Bennet Lawes (later Sir John Lawes), founder of the artificial fertiliser industry, began to apply on his farm estate at Rothamsted, near Harpenden, Hertfordshire, the scientific discoveries of de Saussures, of Geneva. In 1843, in conjunction with Joseph Henry Gilbert, he reorganised, broadened, and systemised these experiments—now known as the Rothamsted experiments, and world famous. This was the beginning of agricultural research in this country. It is interesting to note that one of the most notable agricultural research stations in this country is now placed at Harpenden.

The first work of soil scientists was to impress on farmers the value of artificial fertilisers as crop improvers—a trying task, for there existed a real antagonism between agricultural practice and science, which, fortunately, is past; farmers no longer mistrust the findings of laboratory and field research workers, for they realise that scientific methods are essential if they are to make farming a sound industrial concern.

Lord Melchett.

The work of soil scientists to-day is not so much to show farmers that fertilisers are effective agents of crop production as to solve the different problems that have appeared since fertilisers came into fashion. An article by Lord Melchett, the creator of Imperial Chemical Industries, discusses on another page the wider significance of Jealott's Hill as an aid to scientific development in agriculture.

Soya Bean.

The fourth report (dairy produce) of the Imperial Economic Committee on the Marketing of Foodstuffs makes some interesting comments on the soya bean. This bean is indigenous to China, Manchuria, Korea, Japan, and Indo-China, and it is from these countries that the demand of the English manufacturer is met. Supplies were at one time also received from Russia, but these have now ceased. Attempts have been made to introduce the cultivation of the soya bean into many parts of the British Empire, but it does not appear that, at least for some time, it will be possible to establish any considerable export trade, as in most cases a local demand has sprung up, leaving little or no surplus for export. As the soya bean can be cultivated in regions of very wide climatic differences we consider that these efforts to introduce a new and profitable crop into the Empire should be given all possible assistance and that a rapid increase in the acreage should be encouraged.

Reindeer Eaters.

Vilhjalmur Stefansson, the polar explorer, has been suggesting, in the course of a lecture tour of this country, that the world will ultimately have to choose between becoming totally vegetarian and, alternatively, developing the reindeer resources of the vast Arctic Continent. His argument is that it takes roughly seven times as much land to raise cattle as it does to grow the nutritive equivalent of vegetable food, and when the population increases to an extent that present supplies do not satisfy the world's appetite, meat will have to be produced only where it is not possible to grow the more economical vegetable foods. One such place, according to Vilhjalmur Stefansson, is in the Arctic Circle, where there is room to raise 120,000,000 head of reindeer. Explorers say that the meat of these animals is both tasty and nourishing.

Micro-Organisms.

Few people have any conception of the dangers of infection to which meat and other foodstuffs are exposed from the exceedingly minute organisms—only about a half-millionth of an inch long—which belong to the various groups of bacteria, moulds, and yeasts. Competent observers in various parts of the world have measured the number of these organisms present in a cubic yard of air. This varies from none at Spitzbergen in the Arctic Circle to 4,000 in a city street and 17,000 in a workroom in the East End of London. Most moulds are adapted to distribution by wind, the spores from the parent growth being blown about, whereas bacteria and yeast, when wind carried, usually have to be dried and pulverised before they can be distributed. A common method of facilitating their distribution is by coughing, sneezing, or speaking, when the tiny drops of moisture containing organisms are quickly dried in the air, leaving the bacteria to be readily carried along by the slightest movement of air.

Food Processing.

Jarussova has recently shown from feeding experiments with rats that heating food for several hours at 100° C. does not noticeably affect its nutritive value.

Bakery and Confectionery.

In view of the Confectioners' and Bakers' Exhibition being held at the Agricultural Hall in that month, the September issue will be specially devoted to these trades. Papers are being prepared by Dr. Drake Law (Vanilla), E. B. Bennion (The Development of Emulsification in the Baking Industry), T. H. Fairbrother (Reviews), and L. J. Lord (Reconstituted Cream), amongst others.

Imperial Research in Agriculture

By LORD MELCHETT

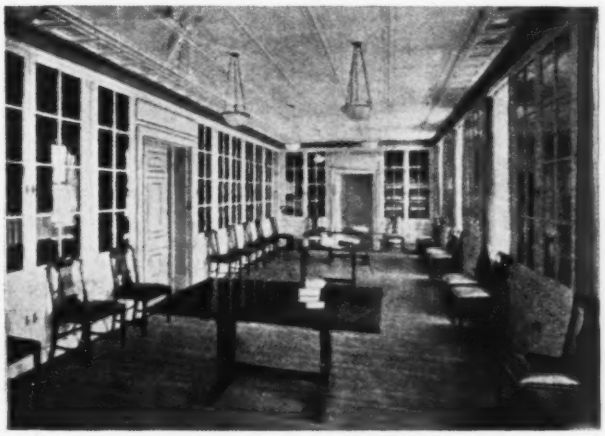
The New I.C.I. Research Station at Jealott's Hill.

Left: A Panoramic View of the Station.

Below: Farm Buildings.

GREAT BRITAIN has set an effective example to the world in the organisation of agricultural research. Other nations may spend more money in fostering such, but there is no country which has so efficiently covered the field of research in agriculture as Great Britain.

But as all interested in agriculture know, there is still room in this country for the promotion of further research in agriculture. This applies not only to the demands of pure agricultural research, but also in those practical fields which apply new discoveries to the hard facts of practice, and which in time make them so generally known that they become, in due course, part of sound agricultural tradition. The new research station at Jealott's Hill,



Library and Conference Room.

covering as it does both the fields of research and application, is destined to gain and retain the goodwill and appreciation of all concerned with agriculture.

Research and Industry.

By this time it is almost a commonplace to say that the activities of Imperial Chemical Industries, Limited, are worldwide. The company and its associates span the Empire. It is the intention of the company that Jealott's Hill shall become the headquarters of the research staff which has the Empire as its province. During recent years, the organisation of agriculture within the Empire has made most notable progress. Through the Jealott's Hill Research Station, Imperial Chemical Industries propose to accelerate that considerable progress which has already been made. For its aim will be to bring the resources of industry to supply the needs of agriculture and to add to the prosperity of the Empire.

Soil Fertility.

Fertilisers made by Imperial Chemical Industries are being exported both to the Empire and to other parts of the world in ever-increasing quantities. They are being used to supply the needs of all kinds of crops. The influence of fertilisers on crop production is affected by all the many soil and climatic factors on which the growth of plants depends. A proper understanding of the uses of fertilisers, therefore,

Soils and Fertilizers Laboratory.

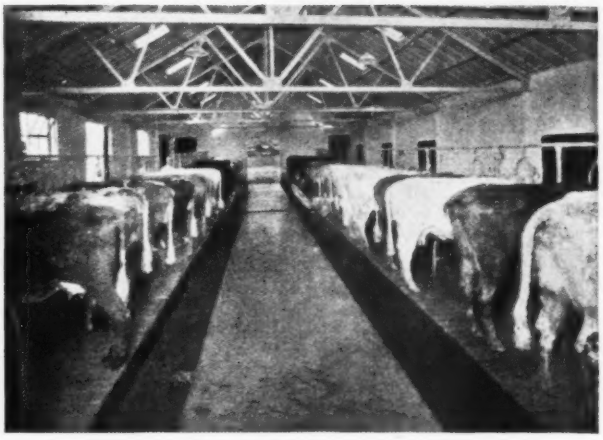
necessitates a study of all these factors. In other words, it will be the duty of the research station to investigate soil fertility in all its aspects in both temperate and tropical countries, and in relation to all crops of economic importance.

One of the most important facts to be remembered is that it is intended that every agricultural investigation carried out at the research station shall be accompanied by a close study of all the relevant economic aspects. The economic investigations must ultimately be carried out on a commercial scale on the farm itself, so that the results will be readily available in concrete form.

Imperial Research.

Of the investigations carried out at the station, a number will be of a fundamental nature, and will find application in any part of the world. Much of the work, however, would relate primarily to English conditions, and especially to the actual conditions of soil and climate which obtain locally. To supplement the investigations of this category it will be necessary to carry out experimental work at centres widely dispersed over the whole of the British Isles, and equally important, in the overseas colonies and dominions, in the Indian Empire, and in the principal foreign countries, where fertilisers manufactured by Imperial Chemical Industries, Limited, are already being used, or to which, within a short time, they can be supplied.

Jealott's Hill, therefore, has a twofold function: Firstly, to aid in the scientific development of agriculture in Great Britain; and secondly, to assist the agricultural needs of the Empire. The staff of the research station, though for the most part located here, will also be equipped as an overseas expeditionary force, to go anywhere within the Empire, or without at the call of agriculture.



Part of the Dairy Herd in the New Cowsheds.

Buildings for Animal Nutrition Experiments.

Scientific Aspects of Freezing

IN the first of a series of papers on the scientific aspects of freezing of foodstuffs, C. Birdseye, of the General Foods Company, Gloucester, Mass., U.S.A., discusses the advantages of "quick freezing." Modern sharp freezing processes include air freezing, slow freezing, and sharp freezing, in which the foodstuffs are submitted to a temperature of about −23° C. to −26° C. On the other hand, in the "quick freezing" process, the products are frozen either by direct immersion in a liquid refrigerant, or by indirect contact with a calcium chloride, brine, etc.

Animal flesh contains water in which are dissolved various salts, and on freezing to about 31° F. fresh water ice freezes out, and a salt solution of a higher concentration is formed. Further lowering in temperature results in further fresh water ice being deposited. In the case of fish, the total water is not frozen until a temperature of about −70° F. is reached, although a very large proportion is frozen when the temperature is at −25° F. From 31° to 25° F. is looked upon as "the zone of maximum crystal formation," and the more quickly this zone is passed through, the smaller in size will be the ice crystals formed. In the usual sharp freezing processes, the centre portion requires some considerable time to pass through this zone, with the result that large ice crystals are formed. These may be up to one inch in length. Such large crystals rupture the delicate tissues, and also compress the more resistant tissues into dehydrated bundles. With "quick freezing," however, either by direct immersion or by indirect contact with a liquid refrigerant, very small ice crystals are produced with no damage to the tissues. The loss by evaporation is also less than that in sharp freezing. A defect known as "frozen burn," due to oxidation of fats, is avoided, hence colour and odour are satisfactory. Finally, loss of moisture during subsequent thawing is very slight indeed. (*Industrial and Engineering Chemistry*, 1929, p. 414.)

The Concept of "Colloid" and its Importance for the Food Chemist

PART I*

The Scope of Colloid Chemistry

By Dr. W. CLAYTON

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The terms Colloid Chemistry and Colloids appear with striking frequency in the modern literature dealing with the chemistry and technology of foods. To the uninitiated a degree of confusion is likely, particularly as the older definition and implication of "Colloid" no longer hold, having been extended somewhat widely. The present series of articles will attempt, therefore, to outline the present conception of colloid chemistry, bearing in mind that readers will be mainly interested in its bearing on food chemistry.

ALTHOUGH CREDIT is generally given to Thomas Graham as the founder of colloid chemistry, there is no doubt that Francesco Selmi, from 1843 to 1848 quite definitely anticipated Graham. Graham, however, in 1861, published an account of his investigations, wherein he described the technique of diffusion, dialysis, and the study of gels, thus opening up a new line of attack in chemical research.

Graham's Definition.

Graham's classical papers dealt with the question of the diffusion in solution of such substances as hydrated silicic acid, hydrated alumina, starch, dextrin, gums, caramel, tannin, albumin, gelatin, and other animal and vegetable extractive matters. Graham reported: "Low diffusibility is not the only property which the bodies last enumerated possess in common. They are distinguished by the gelatinous nature of their hydrates. Although often largely soluble in water, they are held in solution by a most feeble force. They appear singularly inert in the capacity of acids and bases, and in all the ordinary chemical reactions. But, on the other hand, their peculiar physical aggregation with the chemical indifference referred to appears to be required in substances that can intervene in the organic processes of life. The plastic elements of the body are found in this class. As gelatin appears to be its type it is proposed to designate substances of this class as colloids,† and to speak of their peculiar form of aggregation as the colloidal condition of matter. Opposed to the colloidal is the crystalline condition. Substances affecting the latter form will be classed as crystalloids. The distinction is, however, no doubt, one of intimate molecular constitution."

Dialysis.

Graham observed that substances of colloidal character diffused with extreme slowness through a parchment membrane which separated their aqueous solution from water itself. Such separation by diffusion he termed Dialysis. Crystalloids like sugar and salt readily diffused through such a membrane. This led him to conclude that the units in solutions of the colloids were composed of larger molecular aggregates than were present in solutions of the crystalloids. In other words, *complexity of molecular structure was the key to colloid substances.*

Although not generally realised, Graham published the statement that "ice itself presents colloidal characters at or near its melting-point," and that "albumen . . . is seen to assume a crystalline contour. Can any facts more strikingly illustrate the maxim that in nature there are no abrupt transitions and that distinctions of class are never absolute?"

Ostwald's Classification.

Nearly all the textbooks still emphasise that Graham distinguished between colloid and crystalloid, ignoring the fact that he (perhaps only faintly) realised that a transition from one to the other could occur. The present view is that any substance may, by appropriate technique, be obtained in colloidal or crystalloidal form. The terms "colloid" and "crystalloid" are extended to "colloid state" and "crystalline state." The colloid state is recognised as being a convenient classification for a transitional state of subdivision or dispersion. Thermo-chemistry deals not with cold matter or hot matter, but with the *thermal* condition of matter; so colloid chemistry "is not a description of individual colloid materials, but treats of the properties of which colloid systems are but examples." (Ostwald).

Thus far our remarks have been confined to systems wherein a solid is dispersed in a liquid medium. However, as pointed out by Wo. Ostwald, the nature of the substance to be dispersed (the disperse phase) may be varied, just as may be the nature of the dispersion medium (the continuous phase).

It should now be emphasised that colloid systems are but special limited regions in the general range of disperse systems, being transitional between coarse-grained disperse systems on the one hand and molecular solutions on the other. The outstanding characteristic of a colloid system is that the phases

* The series will be completed in six articles as follows:

II. Graham's Colloids—Proteins.
III. Graham's Colloids—Carbohydrates.
IV. Emulsions.
V. Froths and Foams.
VI. Glossary of Terms.

† Greek, *kolla* = glue.

are dissimilar, possessing a very great separating area or interface. The development of a large interface, with its consequent calling into play of surface forces, provides us with that branch of physical chemistry known as Colloid Chemistry, or, as some workers prefer, Colloid Physics. The chemistry of interfaces and interfacial forces, therefore, treats of such systems as films, froths, bubbles, grains, drops, mists, emulsions, jellies, and all cellular formations such as skins, paper, peat, wood, bread and animal and vegetable structures generally.

The following colloid systems are thus possible:

Disperse Phase.	*Continuous Phase.*	*Symbol.*	*Examples.*
Solid	Solid	S-S	Gold in Ruby glass
Solid	Liquid	S-L	Colloidal solutions of metals or gelatin
Solid	Gas	S-G	Smoke and fumes
Liquid	Solid	L-S	Certain minerals
Liquid	Liquid	L-L	Emulsions
Liquid	Gas	L-G	Fog, mist
Gas	Solid	G-S	Solidified froths, *e.g.*, pumice
Gas	Liquid	G-L	Froths and foams

Surface and Interface.

The most striking advance of modern colloid chemistry is the newer knowledge of surface tension and interfacial tension phenomena and the recognition that the surface or interfacial layer possesses a definite structure. The fundamental idea involved is that in the surface of a liquid in contact with air the molecules are orientated or marshalled in definite order, and surface tension is mainly determined by the structure of the surface layer. The surface molecules are so orientated that their most active portions are drawn inwards, so that the least active portions of the molecules (orientated towards the vapour phase) constitute the surface layer. Again, when two pure liquids are in contact, their like parts orientate towards each other, the interface or boundary thus possessing a definite packing or structure of molecules. Considering an organic liquid and water making an interface—*i.e.*, the liquids are not miscible—research shows that the organic radical turns towards the organic liquid and the active or "polar" group towards the water.

The Scope of Colloid Chemistry.

The great complexity of colloid systems permits many methods of approach and attack, but the most illuminating is to follow Ostwald's classification. In this way we meet Graham's colloids, like starch, gelatin, and casein (S/L), oil and fat emulsions, such as milk and mayonnaise (L/L), and the froths on such liquids as milk and beer (G/L). The degree of dispersion of the disperse phase, the area of the interface, the molecular structure of the interface, the presence of electrolytes, all play a rôle in determining the surface and interfacial energy changes and their accompanying electro-physical and electro-chemical effects. Colloid chemistry is the study of the cause and magnitude of these changes. We can now see why this is the chemistry of such apparently diverse phenomena as the swelling of muscle, the "drip" of thawed meat, the setting of a gelatin jelly or the curdling of milk, the separation of cream or the homogenisation of milk, the formation of a foam, or the staling of bread.

(To be continued.)

(Continued from page 221.)

than they were three years ago, though luxury articles are almost undiscoverable. An extraordinary thing is the number and excellence of the patisserie shops. In a time of bread shortage one does not expect to be able to sit in a patisserie shop and eat fancy cakes as plentiful and delicious as any in Paris, nor does one expect to see these shops well frequented. Caviare was another commodity that seemed plentiful. It is of two sorts, the black or sturgeon caviare, and the red or salmon caviare. There seemed to be no shortage of it, and supplies could be purchased in the shops of the fishing trust. Prices in Russia are extremely high, and to the British delegates they were, not unnaturally, higher still. The writer will never forget the daily baths that cost him three shillings each.

The "Economic Ring."

There are no signs whatsoever of weakening in Soviet circles. The Government is firmly seated in the saddle, and the attitude of the people is quiescent. For those undeniable privations that are theirs, they blame the "economic ring placed round Russia by the capitalist powers," and in their eyes the arch-fiend and prime mover in the "sinister plot to overthrow the Soviet régime" is Sir Austen Chamberlain. The Soviet village authorities chalk up "Friend of Chamberlain" on the house doors of those peasants who are known to be neglecting their duty in the matter of supplying grain. The Red Army is well clad, well fed, and well housed. The army offers what it never did in the Tsarist time, a career to the poor soldier. Each recruit from the land receives training in modern agricultural methods as part of his military service. There is method in this. The Soviet object is to send back to the villages generation after generation of young men who will sweep aside the traditional bad practices of their elders, and produce grain scientifically and on a vaster scale than ever before.

Vastly Improved Conditions.

The workers are, on the whole, better off than before. They get a fortnight's holiday paid for, and though they have to work hard, there is no longer the Cossack with fixed bayonet at the gate. In the new factories working conditions are admirable. Buildings are light and airy; machinery is modern. Every factory has its club. The real sufferers under the present régime are the former intellectual and middle-classes, or those who are suspected of disaffection. Ogpu has replaced the Tcheka, and espionage and sinister happenings can be divined if not immediately perceived.

The True Situation in U.S.S.R.

Russia in 1929.

By AN OBSERVER

In the Drama, the Film, the Ballet, and in Art generally Russia leads the post-war world, but how is it with her industries? A member of the recent Trade Delegation sets down his impressions.

THE SITUATION in Russia as it presents itself to an impartial observer is an extraordinary mixture of light and shade. One is shown achievements of which any country in the world might be proud, although there is much, too, of penury and privation. As a member of the British Trade Delegation that recently toured Russia, the writer had ample opportunity to observe for himself conditions as they actually are. It is, however, only fair to say that the following notes refer mainly to the large towns, and not to the country districts.

Moscow—anciently, and again since 1918, the capital of Russia.

Food Shortage.

Reports of famine in Russia are *wantonly* (and perhaps *intentionally*) exaggerated. The food that the British delegates received was, naturally, good and plentiful. This was not allowed to weigh with the writer. He strolled casually into Russian restaurants and ordered such meals as were within the compass of his limited knowledge of the Russian language. He studied the meals that were served to others. He used his eyes in all directions. Briefly, the situation is that, owing to the friction between peasant and Government, there is undeniably a shortage of bread, though not a serious shortage. The cause of this is the inability of the Government to provide the peasant with tangible commodities in payment for his corn. One sees in the shop windows notices reading: "No more boots to-day," or "Trousers expected shortly." This means that even though the peasant is paid a liberal price in paper roubles, they are of little use to him because he cannot obtain from the shops the goods he needs. He cannot spend his money advantageously. Hence he sees no reason why he should strive with might and main to create an exportable surplus of grain. Instead, he grows enough for himself and his family and feeds his cattle on any left over. The reason the Soviets cannot provide him with goods is because they have not yet the factories that will produce them. They are building factories as fast as their means allow, but that is not nearly fast enough. And the reason they cannot build them fast enough is twofold: in the first place, they have not a large enough supply of the highly skilled labour and engineering knowledge requisite; secondly, they have not the ready money with which to purchase those essential foreign commodities which they lack, and which (such as textile machinery and steel) they must have for the erection of their factories. Traders will not grant them credit on the scale they need, and banks will not discount Russian bills at a low enough rate to make this granting of credit a normal business transaction. The only way in which they can buy foreign supplies normally is by acquiring foreign currency and paying for what they need in cash. Even in those instances in which they are obtaining credit from manufacturers, they have to deposit a proportion of the sum involved in ready money. Again, the only way in which they can obtain foreign currency is by exporting to foreign markets. The peasant's refusal to produce an exportable surplus prevents this, and thus closes the vicious circle of the Russian economic situation.

Long Credits Needed.

The policy of the Soviets is, therefore, to build factories to the limit of their capacity so as to supply the peasant's needs. They are seeking longer and ever longer credit as their exportable commodities dwindle. They buy from abroad only what they cannot themselves produce. This state of affairs cannot be indefinitely prolonged, but, given a foreign loan, and within a comparatively short space of time Russia would once again become the world's largest exporter of grain and one of the world's largest importers of finished goods. A loan would enable her to get enough factories built to satisfy the majority of her peasants, and once again her exports to Europe would flow.

The inhabitants of Moscow are rationed as to bread and sugar, but the ration allowance is not illiberal, and there are no signs of hunger or starvation. In the shops goods are a little more plentiful

(*Continued on page 220.*)

Modern Processing in Pea Canning—The New Wisbech Plant

By S. W. SMEDLEY

This is the largest of the four new pea-canning plants opened during the last year. Some idea of its size may be got from the fact that during the present season the daily pack is round about 150,000 cans.

The season for pea-canning will only last until about the middle of the month, the hot weather in July having brought on the crops very fast.

IN DESCRIBING the process of canning peas the starting-point is really the selection of the seed to be grown. This is exceedingly important. One has to arrange the different varieties of peas suitable for canning so that they will arrive at maturity in rotation and not all at once; it would be impossible to can a large pack otherwise.

All varieties of peas are not suitable for canning. Peas that have a large percentage of small sized ones are the ones most used. This is because the smaller the peas the more value they are when canned. The smaller peas are naturally more tender than the large, corny ones.

The second stage is deciding the exact day upon which the peas shall be cut—peas are only fit for canning for a very few days—in hot weather peas may be fit one day and too hard the next. This is one of the most important parts in the whole process.

The peas are then cut with a machine similar to that used for cutting hay or corn, and brought to the factory on hay waggons and immediately threshed in machines known as Viners. These machines separate the peas from the vines. The peas move then by conveyor into the next machine, which is called a cleaner. This removes small pieces of rubbish and the seeds of weeds which have got through the viner. The peas are then weighed. The farmers are paid by the weight of *shelled* peas. This encourages the production of peas against the production of vine.

The peas are then shot on to another conveyor and then into an automatic washing machine, and are washed in an everchanging bath of cold water.

The next stage is grading. The peas pass through a series of drums, sieves which grade them into six sizes. The peas are then blanched according to size, the larger peas being given more time than the smaller ones. Blanching consists of passing the peas through a machine in which is circulating constantly changing boiling water. The peas are then washed again and passed into a machine which takes out split peas and any skins which may have come off in the blanching.

From this the peas pass along a rubber belt, on which they are inspected by girls standing on either side, who take out damaged peas.

The peas are then conveyed to the filling machines. These machines are supplied with empty cans by means of a chute down which pass the empty cans from the store above. The machines fill the peas into the empty cans, and also fill them with the mixture of salt, sugar, and water in which the peas are usually canned. The fillers pass the cans to the seaming machines, which seal the lid on the top of the can, and at the same time stamp on the top of the lid the variety of pea inside, the grade, the quality, and the year in which it is canned. This is of immense importance, as it is possible to have as many as twenty different qualities and grades, all of one variety of pea. In a season where several varieties of peas are packed, the numbers of different marks increase proportionately.

After the can has been sealed the peas are sterilised under pressure in retorts, and then cooled in a cooling tank, which is 100 feet long. By the time the peas have emerged from the water (with which the tank is filled) they are just warm enough to dry themselves without rusting the tin.

The peas are then placed in boxes and stacked in the warehouse all under their grades.

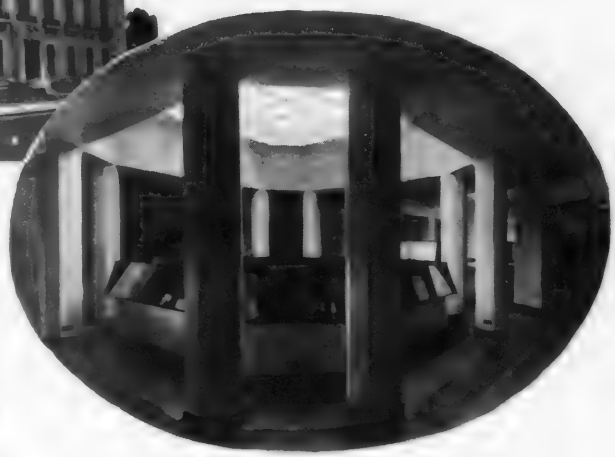
Having given the process, it may be as well to give a glance to the machinery. However busy the season is, the factory has to stop once every twenty-four hours for at least a couple of hours for cleaning the machines. They are washed, first thoroughly with boiling water, and then sterilised with live steam. This is one of the most essential laws of canning which must never be broken. Thorough cleanliness is not only best, it is the *only* way.

Some of the Visitors to Wisbech at the Opening of the New Plant. Most of them were Delegates at the Canning Convention.

A Permanent Museum and Exhibition of Food

Raw Materials and Processing

Promising Developments



A Corner of the Exhibition.

THE LONDON School of Hygiene and Tropical Medicine, which the Prince of Wales opened on July 18, is the outcome of the recommendations made in 1921 by the committee appointed by the Minister of Health of that day, Sir Alfred Mond, now Lord Melchett. This committee, finding that the post-graduate teaching of public health in London was inadequate and uneconomic, advocated the establishment of a central institution, affiliated to the University of London.

The chief difficulty in the way of carrying this into effect was financial. The country, hard hit by the war, was staggering beneath a burden of debt and its trade and industries had not recovered from the conditions which had convulsed the world. Happily the Trustees of the Rockefeller Foundation in New York came to the rescue, and this country gratefully acknowledges the timely assistance which that wonderful Foundation generously extended to it in time of need.

Sir George Newman, Chief Medical Officer to the Ministry of Health, stated the aim of the school as being something more than Imperial. He said: "It is international: it is to create in London a complete school of preventive effort, capitalised by American benefaction, maintained by student fees and Parliamentary grant and open to all nations."

Professor Jameson (Professor of Public Health) said: "The growing demand in every country for better conditions of living and working and for the practical application of the ever-increasing store of knowledge of how to prevent sickness is one of the most remarkable features of recent years. There is already much international exchange of ideas and of methods of working."

This new institution may be expected to play an important rôle in this connection.

The carrying through of the whole project owes much to Dr. Andrew Balfour, and it was at his invitation that Mr. W. B. Tustin, the well-known authority on public health matters, organised the permanent exhibition of food processing and production which is to be found on the second floor of the new building.

This remarkable display comprises not only a collection of data concerned with food production since the Stone Age, but all that the most recent research has achieved.

In organising the exhibition, Mr. Tustin has been materially assisted by Dr. L. H. Lampitt, Dr. W. Clayton, Mr. Niel Palmer (Hovis, Limited), and Mr. Gay (Messrs. Schweppes). The following are the principal sections and the firms responsible: Brand and Company (meat products), Hovis, Limited (cereal foods), Messrs. Crosse and Blackwell (fruit and vegetable products), Planters, Limited (edible oils and fats), Messrs. Mac Fisheries (fish products), Messrs. Schweppes (aerated waters, etc.), *The Feathered World* (poultry products), The Kelvinator Company (refrigeration), Associated Gas Companies (the history of cooking), J. Lyons and Company (tea, coffee, cocoa, sugar, and ice-cream), The British Oil and Cake Company (breeding and feeding for milk products), Messrs. Horlick's (malted milk), J. Lyons and Company (dietetics), and C. Hearson and Company (general laboratory equipment).

The United Dairies' section embraces pasteurisation and processing in the milk industry, condensed and evaporated milk powders, cheese and butter production, contamination in the home and milk inspection.

The Preservation of Fruit for the Jam Manufacturer

By F. HIRST, M.Sc., A.R.C.S.
Director of the Campden Research Station, Glos.

THE SEASON during which the majority of English fruits are available is a short one, covering only a few months in the summer, and it would be impossible in this limited time to manufacture jam on a sufficiently large scale without the use of very extensive mechanical plant. Such plant would only be in operation for a small part of the year, and for many months it would be lying idle, and the overhead charges would add considerably to the cost of the product. It is necessary, therefore, to adopt some method of preserving fruit in sound condition, so that its manufacture into jam may be carried out after the season for fresh fruit is over. There are several ways in which this may be achieved, and the object of this article is to describe briefly the more important methods used. Before doing so, however, it is necessary to say a few words about the principles of preservation in so far as they apply to fruit.

Enzyme Action.

Fresh fruit will not keep for any length of time, as it quickly gets over-ripe and decays, due to certain chemical substances known as enzymes. Unfortunately, enzyme action does not stop when the fruit is ripe, and if not used quickly, it gets very soft and easily bruises. This paves the way for the agents of decomposition, which in this case are principally moulds and yeasts. These micro-organisms are present in the atmosphere, and they are invariably to be found on fruit. Whilst the latter is dry and in sound condition, the micro-organisms do not multiply to any extent, but when the fruit is soft and bruised they increase very rapidly, and decomposition is quickly accomplished.

There are two distinct methods of preserving foods. Firstly, there is permanent preservation, in which the enzymes and the spoilage micro-organisms are killed, after which the foodstuffs are kept out of contact with air so that other organisms cannot enter. In the second method, the enzymes and micro-organisms are not killed, but the conditions of storage are such that their activity is inhibited. Both methods are made use of in the preservation of fruit for the jam manufacturer. Permanent preservation is carried out by means of sterilisation by heat after the fruit has been hermetically sealed in large cans, and also by means of certain chemical substances which destroy the enzymes and the yeasts and moulds. Under temporary preservation we have refrigeration, in which the fruit is kept at a temperature which checks the action of enzymes and micro-organisms.

Preservation by Heat.

Micro-organisms and enzymes are readily destroyed by moist heat, and in the canning of fruit this method is made use of. The fruit should be prepared according to its kind: gooseberries should be snibbed, black currants strigged, strawberries plugged, and plums stalked, etc. If the fruit is dirty it should be washed carefully before it is used for canning. When ready the fruit is packed into the cans. It is then covered with hot syrup and exhausted, or sealed at once without exhaust. An efficient exhaust removes air from the headspace, and also to a certain extent from the cells of the fruit. After sealing, the cans are sterilised in open tanks or in automatic cookers as the case may be, and they are then cooled in cold water. It is a well-known fact that fruits are much easier to sterilise than vegetables. The organic acids which the former invariably contain help in the sterilisation to such an extent that it is not necessary to heat the cans to a higher temperature than that of boiling water.

In canning fruit for subsequent use by the jam manufacturer, large containers are used, and as the same weight of fruit is packed into each can, the contents of a definite number of cans are used for each boiling of jam.

In canning coloured fruits it is essential to use a well-lacquered can, and one with a double lacquer is to be preferred, otherwise the tin has a bleaching action on the colouring matter of the fruit, and the latter is destroyed to a greater or less extent. Canned fruit is used largely at the present time for the manufacture of jam, and canned apricots, black currants, and even raspberries are imported for the purpose. There appears to be an opening in this line for the canners of English fruits.

Chemical Preservation.

Chemical preservatives are added to foods for the purpose of making them unsuitable for use by micro-organisms without making them unsuitable for use as food for human beings. The commonest preservatives of this nature are sugar, salt, and vinegar. We have become so accustomed to the use of these constituents of our diet that we do not consider them as chemical preservatives. Nevertheless, their preservative action is purely of a chemical nature. The principal chemical preservative used in the commercial preservation of fruit is sulphur dioxide. It is generally used in solution, or combined with lime in the form of calcium bisulphite. This preservative is toxic to yeasts and moulds, and destructive to fruit enzymes. It has a further advantage in that when the preserved fruit is made into jam most of the sulphur dioxide is boiled off.

The value of sulphur dioxide as a preservative for foodstuffs has long been recognised in connection with alcoholic and non-alcoholic beverages. As a preservative for fruit, sulphur dioxide is largely used, not only for preserving fruit pulp, but also as a means of keeping whole fruit. The latter method is a very convenient one, as no heat is required, and thus large quantities of fruit can be preserved rapidly and at a cost which is not prohibitive. The fruit should be fresh, clean, and in sound condition, and it should be prepared so that it is ready for making into jam when required. Thus strawberries and raspberries should be plugged, and plums and damsons stalked.

As soon as the fruit is ready it should be placed into clean barrels or large earthenware jars. With soft fruits, such as strawberries and raspberries, care should be taken to see that the fruit does not cake into a solid mass at the bottom of the container. To prevent this, a small quantity of the solution should first be poured into the receptacle and the berries should be allowed to roll slowly into it. When the vessel is full of fruit, it should be filled to overflowing with a solution of sulphurous acid containing 0·15 to 0·2 per cent. of sulphur dioxide. This solution can be prepared by bubbling sulphur dioxide gas through water, or, for more convenient use, a strong solution of known strength can be purchased and diluted as required. A tight fitting bung or cork should be inserted, and it should be sealed airtight by means of melted paraffin wax. The sulphur dioxide diffuses rapidly into the fruit, and after a few days its concentration will be found to be only half of its original value. Provided the percentage of sulphur dioxide does not fall below 0·05 to 0·08, fermentation will be inhibited and the fruit will keep. This cold method of preserving fruit is particularly successful for strawberries, raspberries, loganberries, cherries, plums, and damsons. Currants and gooseberries are not so satisfactory, as the skins harden and tend to be tough when the preserved fruit is made into jam.

In preparing pulp the fruit is broken down by means of heat. This may be accomplished in steam jacketed jam pans, but usually large wooden barrels are used. These are fitted with perforated steam coils, and they are raised from the ground so that when the pulp is ready it can be run direct into the casks, or, if necessary, into a pulping machine in which the kernels, stalks, etc., are removed. The fruit is tipped into the barrels, steam is turned on, and cooking is allowed to proceed until the fruit is thoroughly broken down. In making apple pulp, a certain amount of water must be added, but with plums and soft fruits this is not necessary. When the pulp is ready a sluice valve in the bottom of the cooking vat is opened and the pulp is run direct into casks, or if it requires sieving, into the pulping machine.

Barrels or casks which are to be used as containers for fruit or pulp should be thoroughly clean and free from leaks. It is advisable to steam the barrels until they are free from smell, and they should also be well washed out with a little of the sulphur dioxide solution before they are used. To ensure the casks being impervious to air they should be coated on the inside with a cask enamel which is manufactured for the purpose.

The cask should be filled to within three or four inches of the bunghole, and the bisulphite of lime should be added at once. The amount required will vary with the size of the casks and according to the strength of the bisulphite. Commercial bisulphite of lime can be obtained for the purpose, and approximately 1 to 1½ pints of a 6·5 per cent. solution should be added for each 1 cwt. of pulp. Immediately the bisulphite has been added the bung must be inserted and made airtight, after which the barrel must be rolled several times to ensure a thorough mixing of the pulp and the preservative.

In the manufacture of jam there are three important factors, these are: pectin, acid, and sugar. Provided that the proportions of these three ingredients are suitable, the hot jam on cooling sets to a jelly in which the fruit is embedded. Pectin—in the absence of which it is impossible to get jam to set—is found in fruits generally, but some contain more than others. When fruit or pulp is preserved by means of sulphur dioxide for long periods, chemical changes occur which ultimately may lead to complete conversion of the pectin into derivatives which have no setting value. In making jam from such fruits or pulp it may be necessary to add commercial pectin to get a satisfactory "set."

The sulphur dioxide solution also has a bleaching action on the colours of the fruits. Red plums, strawberries, raspberries, and loganberries lose their red colour. Blue and purple fruits, however, are more resistant, and greengages and yellow plums are not noticeably changed. Some of the colour may return when the fruit is made up into jam, but if it has been stored for a long period the original colour of the fruit does not return.

Refrigeration.

The normal life processes of fruit, such as respiration, ripening, etc., are most active at moderately high temperatures. When the temperature is lowered enzyme action is retarded, and provided the temperature is low enough it may be entirely stopped. Micro-organisms do not multiply at low temperature, and although they are not killed, they cease to act as agents of decomposition. These principles have been applied to a large extent in America for preserving soft fruits for the use of the jam manufacturer.

The berries must be in sound, fresh condition, and they must be plugged and free from leaves and other débris, and any berries showing signs of mould growth must be rejected. The fruit is packed into the containers with sugar, and it has been found that the sugar—by withdrawing water from the fruit—helps to preserve it. It is usual to pack the barrels or thirty-pound tins with a layer of fruit, then a layer of sugar, and so on until the container is full. The amount of sugar to fruit varies from 5 to 50 per cent., and a common practice is to use twice the weight of fruit to sugar. After the barrels are filled and closed they are rolled over several times to mix the fruit and sugar thoroughly. They are then placed as soon as possible into cold store at a temperature of 0° F., and they are kept at this temperature for several days in order to chill completely the entire contents of the container to freezing temperature for the purpose of preventing fermentation or softening of the fruit. The temperature is then raised to 15° to 20° F., and the fruit is stored at this temperature until required. The fruit must not be kept at 0° F. for longer than is necessary, or it will freeze too hard, and the resultant expansion of the contents on freezing might burst the container.

There appears to be distinct possibilities for the commercial development of this cold pack fruit and sugar, and the trade has extended rapidly in America. It is rather surprising, therefore, that it has not been adopted to any extent in this country. The principal argument against it is the cost. When a large quantity of fruit is stored in this way there is not only the cost of refrigeration, but there is a large amount of capital in the form of sugar lying idle.

A New Phase in Milk Distribution

SIR W. ARBUTHNOT LANE recently drew attention to the fact that we had been described as a C3 nation. The occasion was a demonstration of making and filling a light but very strong cardboard milk container, freshly made and sterilised for each delivery and destroyed after use, which was given at the Express Dairy Company's depôt at College Farm, Finchley.

The President of the New Health Society treated the large and representative gathering of visitors to a brief but amusing address, treading on sure ground when he admitted that it was not easy to get merry on milk, there being nothing like a glass of something more potent for that. Then he quoted Mr. Lloyd George to the effect that, as a race, we are physically and mentally deficient.

Whether, of course, the wider adoption of milk as a food will alleviate our *Gedankensträgheit* is another question, but to those interested in efficient milk distribution the appearance of the "Sealcone" container will be recognised as a landmark of some importance.

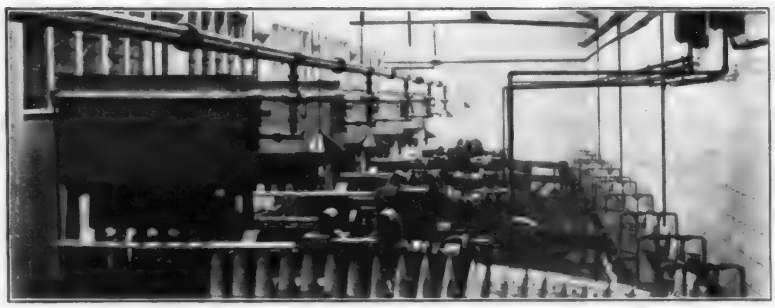
It is principally interesting because: Only by cutting the container can the milk be removed, adulteration becoming out of the question.

When once closed the Sealcone can be carried in any position, exposed to all weathers, and is, in fact, germ, air, and waterproof.

The possibility of souring, due to the bacterial activity which increases with temperature, is rendered negligible, these containers being filled at 34°.

It is formed, sterilised, filled, and hermetically sealed in the filtered air of the dairy itself.

Though simple, this perfect container has taken nine years and over £120,000 to produce. It is anticipated that others will follow the Express Dairy Company in adopting the Sealcone system as more plant becomes available.



Filling the Containers with a Measured Quantity.

Containers being Sterilised in Wax at 190° Fahr. Also rendered Water Tight.

Containers being Formed.

The Feasibility of Standardising Jam Products

By J. W. BLACK

The question of the institution of standards for jam in this country has long been a subject of discussion in the trade. Within the last few months, however, decided steps have been taken in the direction of determining and establishing such standards between the manufacturers themselves on the one hand and those who may be regarded as representing outside authorities on the other.

THERE IS now general agreement that standards must be adopted. Even in quarters where they may not be desired, the necessity is accepted.

It may not be out of place at the outset to state that the writer, though actively interested in this question up till a few months ago, and strongly favourable to standardisation, is not now connected with the jam trade and is unlikely to be concerned with or affected by any decision come to on the matter. The suggestions made are those which, in his judgment, are sufficient to remedy the undoubted evils arising from lack of standards, to abolish which some outside authorities would, it is to be feared, favour regulations unnecessary and undesirably drastic and based on an inadequate knowledge of the industrial side of jam manufacture. It is not the purpose of this article actually to formulate specific proposals in regard, for example, to fruit and sugar content, total solids, etc., but rather to state the principles which, if accepted on both sides, would facilitate agreement on matters of detail between manufacturers and authorities. Even with such agreement in principle, the formulation of the actual standards will make considerable demands on the time and knowledge of those entrusted with the task.

Before passing to specific details a few general observations may be made, some of which will be referred to again in this article.

Apart from objections made for reasons which may be ignored, it has been felt, even by some favourably disposed to standardisation, that the matter should be delayed till some better means of enforcing regulations than exist at present can be devised. While admitting certain difficulties of this kind, it would rather seem that if standards are necessary and desirable in the interests of both trade and public, the sooner they are set up the better. The validity of a standard is not affected by the ease with which it may be enforced or evaded, and means to enforce a standard are more likely to be evolved when it is in existence than when it is merely proposed. Moreover, the fraudulent evasion of an official standard places a manufacturer in a position which few would care to occupy. It is also possible greatly to exaggerate the difficulty of enforcing such standards.

Existing Standards.

America has possessed jam standards for a considerable time, which are receiving special attention from the Department of Agriculture at the present time. German preservers and food control chemists in Germany have also arrived at agreement on regulations which will be formally ratified by the State Board of Health. While these measures are worthy of careful study, it is to be hoped that undue attention would not be given either to their form or substance in respect to British standards. British jams and confectionery were for long unapproached in quality, and are still unsurpassed, if indeed they are equalled. We may claim that in this matter we know our own business best, and standards should be based on the best British practice and nothing less.

The object of standards is to maintain our best products at the same high peak of quality, to protect these against unfair competition from cheaper products, and to protect the public against misdescription either in labelling or advertisement.

The American regulations, existing and projected, institute a complicated system of labelling, involving the use of terms such as "imitation," which do not commend themselves to our ideas and are not necessary. They lay down proportions of fruit to sugar unsuitable for our product and not in accordance with our best practice. The German regulations are of a complicated character which appear to be in some respects derived from the American standard. It is rather curious that they do not fix a standard for total solids—an omission which is amended in the new American proposals—but lay down a minimum added sugar content in the finished jam or preserves which is most unlikely to be suggested by a British manufacturer.

Domestic Standards.

It is possible that in any discussion on jam standards for Great Britain demands from certain quarters would be based on domestic practice and cookery book recipes. While it is possible to understand this view, it is, nevertheless, an unsound one. It is based on a failure to appreciate that the problem of the manufacturer and the housewife are not the same, being, in fact, very different in respect of the demands made on their respective products. An article which, when made, is placed in a larder till required, is consumed within a relatively short space of time and is not subjected to severe criticism with regard to quality, firmness, and keeping qualities, need not be compared with one which has to remain sound, clean, and presentable over indefinite periods under varying conditions of storage and climate.

Such demands are based on relative ignorance of trade conditions, and make the great assumption that the domestic products are the best, an assumption which it would be very difficult to prove.

It is not too much to say that far from accepting the standards of the housewife, that good lady would in many cases be only too glad to avail herself of the

resources of modern scientific jam making if the knowledge and materials employed in the industry were available in her kitchen.

In every industry where competition is keen and prices are cut very fine, there is always a powerful incentive to reduce costs of production and obtain an advantage over competitors, even if only temporary. In some of these, owing to the nature of the product, this can only be done by increased efficiency, greater production with correspondingly reduced labour and overhead costs. In others it is possible partly to attain the desired result by cheapening the cost of the article itself through to the raw materials composing it, including water. Jam is such a product, and if such cheapening processes are uncontrolled, either in respect of composition or description, a point is reached where cheapening comes dangerously near to adulteration, and in some cases actually becomes so.

It is difficult for reputable makers to resist this form of competition without imitating it, and the public are the ultimate sufferers. The following figures show the formulæ employed within the writer's knowledge in the manufacture of jams labelled strawberry and apricot.

	Fruit Pulp.	*Other Fruit Juice.*	*Apple Extract.*	*Cane Sugar.*	*Glucose.*	*Wt. Prod.*
Strawberry:	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*	*lbs.*
(1)	48	Nil	2	72	Nil	112
(2)	40	30	4	72	Nil	112
(3)	45	51	Nil	53·5	16·5	112
Apricot:						
(1)	54	Nil	Nil	72	Nil	112
(2)	40	Nil	3	58	16	112
(3)	30	50	Nil	58	16	118

These jams were, of course not sold at the same price. Strawberry, Nos. 1 and 2, confessed on the label to the presence of a little "other fruit juice," while Nos. 3 in each case stated that they contained other fruit juice without the qualifying "little." It is doubtful, however, if the purchaser noted the distinction. While none of the above formulæ is put forward as a standard, it is necessary that clear distinction should be drawn between such products. Neither is it intended to approve or disapprove of these manufactures. It is only fair to say that No. 3 in each case was made to meet a special case by manufacturers who also produced some quite good class jams, and who devoted much attention to the labelling of these products.

British Standards.

The foregoing paragraphs have suggested the troubles that may arise through lack of reasonable standards, troubles that react to the disadvantage of both manufacturer and consumer.

At the same time, it is just as undesirable to try to remedy these evils by regulations much more drastic than is necessary, and which might only cause greater evils than they correct.

The following suggestions are made in the belief that if the principles laid down formed the basis of specific regulations or standards, these would provide adequate protection for the purchaser; the necessary freedom of manufacture for high class jams and preserves, and the safeguarding of high class articles in competition with cheaper products without injuring the manufacture of these cheaper products, which are in themselves quite wholesome, palatable, and useful food products.

For this purpose all jams and preserves should be frankly divided into two classes, "grade 1 or first quality" and "grade 2 or second quality." The nomenclature does not matter. Indeed, grade 1 might be simply "jams" and only grade 2 be required to qualify the definition.

Grade 1 Jams.

These would include preserves which would bear a "New Season's" slip and others which, while conforming to certain standards of quality, would not be entitled to bear the "New Season's" label. It is not desirable, in the interests of an important national industry, to refuse the grade 1 qualification to good class jams made from sound pulp. Grade 1 "New Season's" preserves should be made from fresh fruit and sugar with the addition in certain cases of a small and defined proportion of other fruit juice in the case of certain jams. These would include strawberry, raspberry, and probably apricot. The others would not contain any added fruit juice.

Regarding the proportion of fruit to sugar which should be present, only a minimum proportion of fruit should be specified, and might be best expressed as a percentage of the finished article. The minimum amount of soluble solids should also be defined. This should lie between 67 and 70 per cent., and would provide sufficient regulation for the proportion of fruit to sugar and to the amount of the latter present. The American and German proportions, 45 fruit to 55 sugar, are not only unsuited to our superior products, but introduce a wrong principle into jam making. Standards for fruit content of grade 1 jams new season's or otherwise, should allow sufficient latitude not only to permit of variations in the fruit, seasonal or local, but permit even a certain variation in the type of jam on which manufacturers have established their different connections.

"New Season's" Jam.

The quality and character of jams are not determined solely by the amount of fruit to sugar contained, and in certain cases a manufacturer trying to improve his jam by adding more fruit, or boiling to higher consistency has met with results quite contrary to his expectations. In the case of "New Season's" grade 1 jams it might even be desirable to permit the use of fruit temporarily preserved during, and used up within, the actual duration of the season according to the way in which the fruit is preserved.

Also a limit should be set to the age of jams which could be sent out from the factory bearing a "New Season's" slip, no matter how they were originally made.

In any case regulation of the use made of this description is an urgent necessity, as the term is applied to jams and preserves which contain only a proportion, and sometimes a moderate proportion, of new season's fruit.

Grade 1 jams would conform to new season's jams in all respects except that sound pulp not older than

the last fruit season would be used, and the proportion of pulp to output for each jam might be a little higher than for fresh fruit.

In Mixed Fruit jams of grade 1 class, which often consist of a cheap fruit with a more expensive one, the minimum proportions in which the dearer fruit should be present should be laid down. Some guidance for this is found in the old wartime order which stipulated a minimum of 25 per cent. for any fruit named on the label. The re-establishment of such a minimum would work a considerable improvement, though where the jam consists of only two fruits, like raspberry and apple, the figure is extremely moderate.

Glucose.

In the foregoing suggestions the use of glucose in grade 1 jams has been avoided. Reasonable objections might be raised to this omission, as glucose is not a cheapener. At present, the writer understands, it is actually dearer, weight for weight, of solids present. It is added to jams for certain specific and legitimate purposes. At the same time glucose, though it contains sugar, is not wholly sugar, though perhaps the best reason that can be given for excluding the use of glucose from grade 1 jams is that those made with sugar only require more skill and care in manufacture than when glucose is employed.

Added Fruit Juice.

Much discussion has centred round what "fruit juice" and a "percentage of added fruit juice" really mean. Some agreement must be come to on this point.

Some hypothetical fruit juice must be taken as a standard to which concentrated fruit extracts should be referred, and such a standard might be a hypothetical apple juice containing 1 per cent. pectic acid. This figure, though higher than the Canadian standard (0·7 per cent.), is justifiable on the basis of the pectic acid content of the juice, which could theoretically be expressed from certain types of apple.

If a manufacturer were actually employing fruit juice itself, the hypothetical strength standard would not apply to this case, but only the percentage standard.

If the standard fixed were, say, 10 per cent. other fruit juice, this would mean fruit juice equal to 10 per cent. of the weight of the finished jam.

Where a concentrated apple or other fruit extract containing 4 per cent. pectic acid was used, the proportion of this juice allowed would only be 2½ per cent. of the weight of the jam produced.

Under some such restrictions and regulations the amount of fruit juice added to grade 1 jams, where permitted, would be regarded as an integral part of the jam, and no declaration of its presence should be required.

Residual Preservative.

The preservatives in Food Regulations, 1926, limit the residual SO_2 which may be present in jam and preserves to 40 parts per million. This figure is seldom or never reached even with pulp jams; where present it is usually far below this negligible figure, and in most cases, in the writer's experience, SO_2 is practically absent. In these circumstances any proposal to classify or stigmatise a jam on the basis of the presence or absence of SO_2 is an insistence on trivialities which are likely to result in neglect of important matters. No reference should be required to the presence of residual preservative in any class of jam at all.

The use or otherwise of infinitesimal quantities of artificial colour in grade 1 jams is a question of small importance so far as the consumer is concerned, so long as the colours belong to the permitted class and are up to food quality standard. This is a matter of taste and is without prejudice to the public, and in spite of the prominence which some are inclined to give to this matter to the neglect of more important consideration, colour should be permitted in grade 1 jams without declaration. The addition of infinitesimal qualities of such ingredients as natural fruit acids, and certain salts which can sometimes be employed with great advantage by modern jam makers, should also be permitted without declaration, particularly as these are themselves harmless foodstuffs or ingredients of foodstuffs.

This does not apply, of course, to agar-agar, gelatine, or artificial thickeners foreign in character to fruit and jam, and which have almost ceased to be used.

These points cover the requirements of standardisation in respect of first quality jam. While they would impose a sufficiently rigid standard, they leave sufficient latitude to meet trade requirements, and it should be observed that it is still possible for manufacturers of jams of this class to claim if they so desire, either by advertisement or by labelling, certain qualities which their products may possess in contradistinction to other. Such claims might be "Made from fresh fruit and sugar only," "Free from preservative and colouring matter."

Grade 2 Jams.

In respect of jams which do not conform to grade 1, this would require to be clearly and unequivocally stated on the label. If this were done probably little more in the way of standardisation is required, though it could not altogether be neglected.

The use of glucose would be permitted up to a definite amount. The percentage of fruit or fruit pulp, as well as the quantity of other fruit juice and the amount of total solids, could vary within very wide limits, or even be left to the discretion of the manufacturer. In cases, however, where the amount of other fruit juice exceeded that permitted in grade 1 jams, the fact should be stated on the label, without any qualification. In the case of grade 2 mixed fruit jams, some definition as to the minimum proportion of the dearer fruit which may be present could be laid down with advantage, but apart from these somewhat mild restrictions jams of this kind might safely be left to be judged by the public on a basis of price and quality only.

The use of ingredients like agar-agar and gelatine, of a character foreign to jam, would not be permitted even in second quality products.

(*Continued on page 232.*)

Trade News

Food Packed in Glass

(*Continued from July issue, page 201.*)

THE HEARING was concluded on June 29, when counsel made their final speeches. Mr. Macaskie, for the opponents, said that the main question was whether the Marking Order was going to harm either the home trade or the export trade, or both. Overwhelming evidence, he said, had been given that to mark the container would lead the consumer to think that the contents were foreign as well, and there was a risk that under the Merchandise Marks Act food packers would be prosecuted for applying a false description to the goods because the container or wrapper of the goods had the word "Foreign," when, in fact, the contents might not be foreign at all. He said that all the actual purchasers of the imported glass containers were fully aware of the source of their origin, and it was they who were the consumers whom it was said that it was the purpose of the Act to protect.

Mr. E. H. Wethered, summing up for the applicants, said that the inquiry was of great importance to the bottle and glass container industries, as there were 17,400 people employed in it, and the production of bottles was valued at £5,315,000 and the total output was nearly a thousand million bottles a year. Mr. Straus, of Virol, Limited, had said that the trouble was that any change-over might affect the sales to an extent, and actually asked to have an alternative supply kept open in case there was a strike or stoppage. That was quite an irrelevant argument, and if necessary the Act could be suspended by an administrative decree. If he had to buy in England he said that he feared prices might be raised, but that was countered by Sir Stanley Machin, who had said that there was plenty of competition between manufacturers in England.

Mr. Morris had declared that the food packers were the real buyers, and as they knew where their supplies came from there was no possibility of their being misled, but was that a good answer when it was admitted that the container was sold with the contents? Sir Stanley Machin, Mr. Shippam, Mr. Beach, and Mr. Pirie had stated that difficulty would arise if the container were marked "Foreign," but the container in every case was made either for special orders or they were made for stock for the English market, so that English buyers could have any lettering put on they wished. Sir Stanley Machin had admitted that putting on the words "Foreign containers" would lessen the objection, whilst Mr. Straus had agreed that if the bottle were marked "Bottle made in Germany" the purchaser would not impute the origin to the contents if they saw the whole mark. They did not understand the objection that trouble would be caused in the export markets in regard to the sweets packed by Mr. Pascall, or the meats by Mr. Shippam, or the jams by Mr. Beach, in view of the fact that these containers would also be labelled with labels which indicated what their goods really were, and if the bottles were marked quite clearly "Bottle" or "Jar made in Belgium" or "Czecho-Slovakia" as the case might be.

The fears of the witnesses for the opposition were all supposition, and there was no evidence given of a single instance where, in fact, any confusion had arisen at all. There was really no substance in the objection.

Another objection was the cost of marking. Sir Stanley Machin had expressed his view that the cost of marking would be infinitesimal. It was also feared that the price would be raised against the English food manufacturers, but Sir Stanley Machin had said that English and foreign prices were strictly competitive and that there was plenty of competition in the home market to keep down prices.

The Chairman: I thought the objection was that the marking of those glass containers for foodstuffs would make it impossible to go on using foreign, and therefore would put the packers into the pockets of the English manufacturer.

Mr. Shippam had complained that he could not get satisfactory containers for packing his meats in this country, but, when challenged, he had to admit that he had tried some English ones and found them quite satisfactory. Evidence had been given as to that by a member of an English glass works, and examples of food in glass submitted to the Commitee showed that there was a considerable trade in packing tongues in English glass to-day.

When considering the question of containers it was worth recalling that the Committee on the China-ware Inquiry had reported that they did not see their way to recommend that containers should be excluded from any marking order, and they did not see that there was any reason why a mark on the base of an article should refer to the contents. Moreover, any exclusion might lead to evasion.

This concluded the inquiry, and the Chairman said that a report of recommendations to Parliament would be issued in due course.

ACCORDING to a statement issued by the Ministry of Agriculture and Fisheries, the East Anglian herring fishery shipment season, which has just closed, has been marked by a considerable increase—some 636,000 barrels having been exported as compared with 518,000 barrels the previous year.

Danzig is shown as far in the lead as a port of destination, with about 212,000 barrels, and Stettin, Germany, second, with 104,000. A good proportion of the shipments to these two points was undoubtedly intended for trans-shipment to Russia, and the same was true of most of the shipments to the other chief ports of destination—Konigsberg, Murmansk, Libau, and Riga.

FOOD MANUFACTURE is sent to any address in the World for 10s. per annum. Send your subscription now to LEONARD HILL, LTD., Thanet House, 231-2, Strand, London, W.C. 2.

MESSRS. CADBURY'S Bourneville works is rarely missed by visitors to the Midlands. The above photograph, reproduced by permission of the *Bourneville Works Magazine*, a first-class house organ, shows Bourneville in its less serious aspect.

* * *

It is said that a cocoa association is being formed in London. Its purpose will be the study of all problems affecting the entire cocoa industry and the dissemination of accurate crop information. The membership is open to all firms interested in the cocoa trade, including manufacturers.

* * *

Bakers and Confectioners who intend to compete at the London Exhibition should, if they are members of a recognised bakers' association, have received a copy of the Official Schedule. Any member of the trade who desires a schedule but has not received one, and who is a member of any association, should apply to his secretary, but anyone who is not a member of an association should apply to H. S. Rogers, 11, Queen Victoria Street, London, E.C. 4, when one will be sent post free. Secretaries of associations requiring a supply are advised to communicate with Mr. Rogers.

* * *

Many of our readers will, no doubt, be travelling to London for the above exhibition by rail. The usual summer excursions will, of course, be available, but it often happens that a few members of an association like to travel together. This can be done (providing there are at least eight members on any train) at a greatly reduced fare. In addition, the railway companies have practically agreed to put on an excursion to London from most towns in the country on Monday, September 9, and this will be a most convenient time for a large number of visitors.

In addition to these facilities the motor coach companies are running trips, and particulars can be obtained from their local offices.

* * *

The *Bradford Telegraph and Argus* Cookery, Food, and Health Exhibition, September 24 to October 5, is practically assured of an outstanding success, judging by the number of applications from housewives for details of the cookery competitions which have been received.

The first application forms for space in the London section of the British Industries Fair, which is to be held from February 17 to 28 next year in the specially reconstructed Olympia, Hammersmith, have been issued by the Department of Overseas Trade.

The work is being hurried on at Olympia, where a new four-story building for the Fair is being put up. Two floors will be complete by February, and by means of bridging the galleries of the existing buildings and other reconstruction work, there will be ready for the coming Fair a vast two-story exhibition building, the first of its size and kind in the country.

"Owing to the impossibility of completing the new building in time, the available space next February will be less than that occupied at White City this year—260,000 square feet as compared with 320,000—but the advantages of moving at once to the new site are considered by the Department and by its advisory committee of exhibitors to outweigh the reduction of space, which, moreover, will be only for the one year. In 1931, when the four-story building is complete, there will be as much space as was used at the White City and ample provision can be made in subsequent years for the expected steady growth of the Fair.

* * *

Liverpool is a most important centre for the sugar refining trade, which is one of her oldest industries. Something like 800,000 tons of raw sugar come into the city each year, and the increased quantity has materially augmented the revenue derived from port dues. The sugar crops of the world are estimated at 26,750,000 tons against 23,500,000 tons only five years ago, and 18,000,000 tons before the war. The Liverpool staff of Messrs. Tate and Lyle, which deals with something like 7,500 tons of sugar a week, numbers about 1,700. This firm has also two refineries in London and another at Greenock dealing with something like 30,000 tons of sugar a week.

* * *

A new publication by J. and E. Hall, Limited, of Dartford, Kent, under the title "Refrigeration and Ice Making Machinery" should become a standard work of reference on the subject. It is admirably illustrated and indexed.

* * *

In an article by Herbert N. Casson, written for the Boston News Bureau, it is stated that "The world's consumption of tin is now 2,000 tons a month greater than it was two years ago. Yet, at present prices, the revenue of tin producers will be less than it was in 1927.

"There has been a booming demand for tin, caused largely by the expansion of the automobile industry.

"The total amount of visible tin in the world at present is only a two months' supply.

"As yet, no satisfactory substitute for tin has been found. Not even in Germany, where industrial chemists have been trying to solve the problem, has any substitute been found that has come into general use.

"British tin experts do not believe that any new important fields will be discovered. A worldwide search was made in 1927 without discovering any new source of supply."

Salmon Recipes

PART II.

The following are taken from a book issued by the Associated Salmon Packers, Seattle, U.S.A., containing the best of several thousand recipes received in a nation-wide contest in which prizes were offered.

Salmon Salad.

1 lb. can salmon.
2 cups celery cubes.
4 hard-boiled eggs.
1 lemon, sliced.
1 cup ripe olives or green stuffed olives.
1 tablespoon capers.
¼ cup pickled beets, sliced.
½ cup French salad dressing lettuce.
1 cup mayonnaise.
Paprika.

Flake the salmon, put it into a bowl and marinate it with half the French dressing. Put the celery cubes into another bowl and marinate them with the remaining French dressing. Let these stand in a cold place for an hour if possible.

Cut the hard-boiled eggs in quarters, lengthwise.

If ripe olives are used, remove the pits and chop the olives, not too fine. If green stuffed olives are used, cut them in two, lengthwise. Drain the celery and salmon, mix them with one-half the olives, add the capers and one-half cup mayonnaise. Blend well. Line a salad bowl with lettuce, fill it with the salmon mixture. Garnish it with slices of lemon, the remaining olives, slices of hard-boiled egg, and pickled beets. Put the rest of the mayonnaise on top. Dust it with paprika. Chill thoroughly. This may also be packed into small moulds and arranged on a bed of lettuce in individual servings or with all the moulds on one large platter. This will serve eight.

Salmon Club Sandwiches.

1 eight-ounce can salmon.
12 slices bread
3 tablespoons butter.
Lettuce.
2 large tomatoes.
Salt.
24 thin slices bacon.
Mayonnaise.

Wash and dry the lettuce. Chill it. Cut bread one quarter of an inch thick. Remove crusts. Toast. Cream or melt the butter. Butter the toast. On the first slice of each sandwich lay a lettuce leaf, then three slices crisp broiled bacon. Cover the bacon with a layer of flaked, canned salmon. Lay a slice of tomato on top of this, sprinkle with salt; add mayonnaise as desired. Put a second slice of toast on the filling and proceed as with the first slice. Cover this with a hot slice of toast.

Cut each sandwich in two, diagonally; trim edges and serve on individual plates garnished with a lettuce leaf, slice of dill pickle and a ripe olive. This makes six sandwiches.

The Feasibility of Standardising Jam Products

(*Continued from page 229.*)

Jellies and Marmalades.

The principles applied to the jams should apply to the jellies with such modifications as the different character of the products requires. The proportions of juice used would not be of such importance as the purity of the juice used, as enough to give flavour and firmness to the jelly must be employed in any case, and juices vary considerably in these qualities. The minimum percentage of solids would not necessarily be the same as for jams.

Marmalades should be the product of citrous fruits only, so far as the fruit elements are concerned. The principles adopted for grade 1 jams and jellies should otherwise apply to marmalades as far as possible. The most important matter in connection with these preserves is the prohibition of the use of pectins, extracts, and fruit juices other than those derived from citrous fruits.

Though the standards suggested in the foregoing are of a simple type, their enforcement depends ultimately on the capacity of analysts and other authorities to detect infringement. This is neither quite easy nor so impossible as might appear, and those who are in favour of imposing rigid and complicated restrictions should bear this in mind.

Enforcement of Standards.

The difficulty arises not from the failure of analytical methods so much as the interpretation of analytical results, and the obtaining of representative samples. It is probable that the practical knowledge of the jam manufacturer is necessary in many cases to supplement the work of the analyst in arriving at a correct judgment, and the price, appearance of jam, nature of fruit used, would all assist to this end. Assuming the existence of standards, however, it should not be difficult for authorities and manufacturers to co-operate for their enforcement, and some such arrangement, according to the writer's information, is in force in America. The writer was required some time ago to give an opinion on the relative qualities of a number of jams of varying prices, particularly in respect of other fruit juice present. It may be remarked that some of these had already been the subject of reports in which the amount of added fruit juice was as definitely and clearly stated as the amount of moisture or total solids might have been. This was, of course, impossible, and, as a matter of fact, the figures given in some cases at least were, to certain knowledge, very far from the truth.

Combining every source of information regarding the qualities and character of the jam and basing his opinion on analytical results, combined with examination of the jam and fruit employed, the writer was rather surprised to find how near to the truth he came in known cases, and to how large an extent the analytical data supported the opinion formed for other reasons. It does not appear, therefore, that it would be unduly difficult to secure a reasonable measure of adherence to any standards provided they are necessary and reasonable.

THE BARCELONA International Exhibition opened on May 19 by King Alfonso and the Queen is now almost completed. In his address given at the formal opening of the British section, Sir George Grahame, the British Ambassador, said that Spanish buyers would see by the exhibits that the high standard of excellence of British manufacture has in no way deteriorated.

About the British section, as an exposition of the product of British industry before the world, alongside that of other European countries in the first great international fair held since the war, the correspondent of the *Manchester Guardian Commercial* writes scathingly.

England's Poor Show.

"It is impossible," he says, "for an Englishman to write with anything but feelings of humiliation and mortification. Housed in a building resembling a large railway goods shed, situated on the outskirts of the beautiful exhibition grounds, far removed from the handsome and well-appointed pavilions erected by other leading European countries, the casual visitor from overseas may be forgiven if he asks himself whether the stories of Britain's decadence are not after all true when the once leading industrial nation of the world can make so poor a show.

The Finest Industrial Exhibition Ever Held.

"At a time when, as Lord Riddell stated in his address at the opening of the British Advertising Conference at Newcastle, it is vital that our country should maintain and extend her foreign markets, we have wilfully neglected an opportunity which may never occur again. International exhibitions are costly undertakings, and Spain, more for political than any other reasons, has incurred enormous expense in holding what, by universal consent, is the finest international exhibition that has ever been organised. Visitors are going to Barcelona from all parts of the world, and it is depressing to see the poor and shabby part which Great Britain has taken in this demonstration of industrial power."

International Milk Exhibition.

An international milk and milk products exhibition will be held at the Palais du Cinquantenaire, Brussels, from September 21 to October 6, 1929. The exhibition will be divided into the following sections: 1, Milk; 2, butter; 3, cheeses; 4, milking, butter making, and cheese making apparatus; 5, transport and handling; 6, designs for laboratories, factory, and byres; 7, cooling and refrigeration; 8, bacteriological control; 9, various agricultural produce; 10, fertilisers, seeds, and agricultural implements.

The stands are arranged in sizes of 48, 36, 24, and 12 square metres, except the corner stands, which are a minimum of 24·2 metres.

Further details can be obtained from the Secretary's Office, 8-10, Place de Brouckère, Brussels.

Standardisation in Canada.

A Canadian Order in Council, published in the *Canadian Gazette*, establishes new standards of quality for jam, preserves, marmalades, fruit jelly, and fruit butter, and provides that tin containers of jams, jellies, and marmalades manufactured in or imported into Canada for sale shall contain 1, 2, or 4 lbs., net weight, and glass or stone containers 3, 8, or 12 ozs., or 1, 2, 2½, or 4 lbs. These shall be known as the standard size containers for the products specified, and will be accepted without declaration of net weight on the label. Containers of over 4 lbs. capacity may be used upon declaration on the label of the net weight in pounds (not in ounces) in letters not less than half an inch high. If a standard size container contain less than the minimum net weight, the label must bear the words "Contents ——— per cent. short weight" in type not less than 3/16th of an inch high. Containers of other sizes still in stock or under contract may be offered for sale until September 30, 1930, provided that there is printed on the label or on a sticker attached to the container the words: "Net weight ——— pounds" (⅜ inch high). "Not a standard container" (3/16th inch high).

"Too Many Sizes of Cans."

This is the subject of an editorial in a recent issue of the *Canning Trade Journal*, in which it is stated that the tomato industry in the United States uses twenty-two different sizes of cans alone and as many more sizes of glass jars into which tomatoes have been packed and offered to the consuming public. "It has simply reached the ridiculous, and it is time that sanity took hold of this and regulated it into sense," said the writer, adding that "here is work which the Government's Division of Simplified Practice should undertake at once, and bring some order out of this utter confusion. Each packer will strenuously contend for the retention of his particular sizes, but in a matter of this kind the general good of the whole industry must be put first. Let the Government begin on these can sizes and, with the industry, work them down to a comparatively few, and as few as the needs of the consumers will permit."

Pectin Preparations.

Pectin is being used in Germany under various trade names for "jelly centres," being considered an improvement over agar, as the latter is not a natural food product. A writer in the trade journal *Der Zuckerbäcker* suggests the following formula for fruit jellies:

80 parts pectin preparation.

1,000 parts sugar.

850 parts water containing either the natural fruit juice or artificial fruit essence.

The ingredients are dissolved and boiled and brought to 28° to 29° Bé. The pour must be used at once. Stiffer jellies are obtained by increasing the pectin preparation content 10 to 12 per cent. The pectin material consists of 20 per cent. dry pectin substance, 68 degrees cerelose (a sugar) and 12 per cent. tartaric acid.

Canadian Canning.

During the fiscal year just ended Canada exported to the United Kingdom canned vegetables to the value of $1,019,899, which compares with $916,544 in the previous year. The quantity was 14,075,970 lbs., comparing with 13,047,544 lbs. There were large increases in exports of canned haricot beans, also in tomatoes, which latter are classed as "vegetables" in the trade returns. During the calendar year 1928 exports of canned tomatoes to Britain were 607,115 lbs., valued at $39,820, as compared with only 92,055 lbs., worth $5,162, in 1927. Last year large areas were placed under tomatoes, and further expansion is occurring during the 1929 season.

Dried Milk Research.

It was decided that continued research on dried skim milk as a source of serum solids will help both the manufacturer of ice-cream and the maker of dry skim milk, at committee discussions in connection with the fourth annual meeting of the American Dry Milk Institute, held recently at Chicago.

Plans for continued research will be made in detail after the research committee of the institute has had an opportunity to study the results of a two-year research project which is now nearing completion.

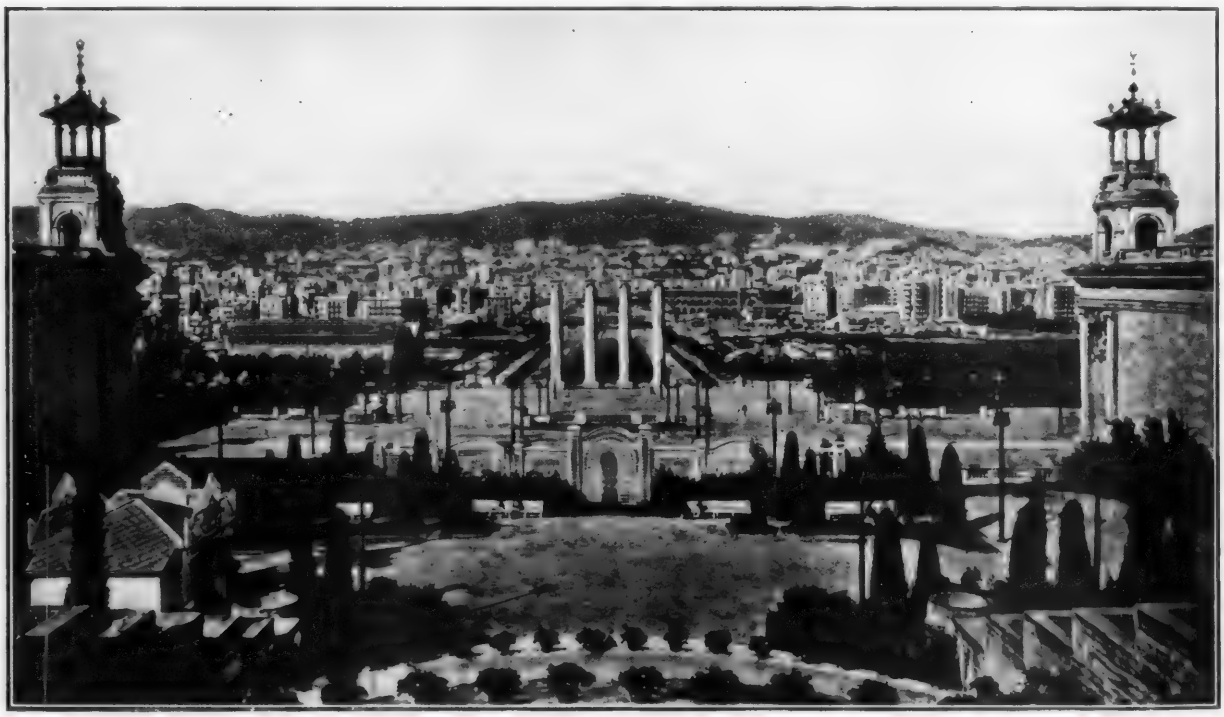
Chicago Chosen Again.

Chicago, the metropolis of the Middle Section of the United States and the greatest railway centre in the world, has again been selected as the most advantageous place in which to hold the Annual Convention of the National Canners' Association and Allied Industries next January.

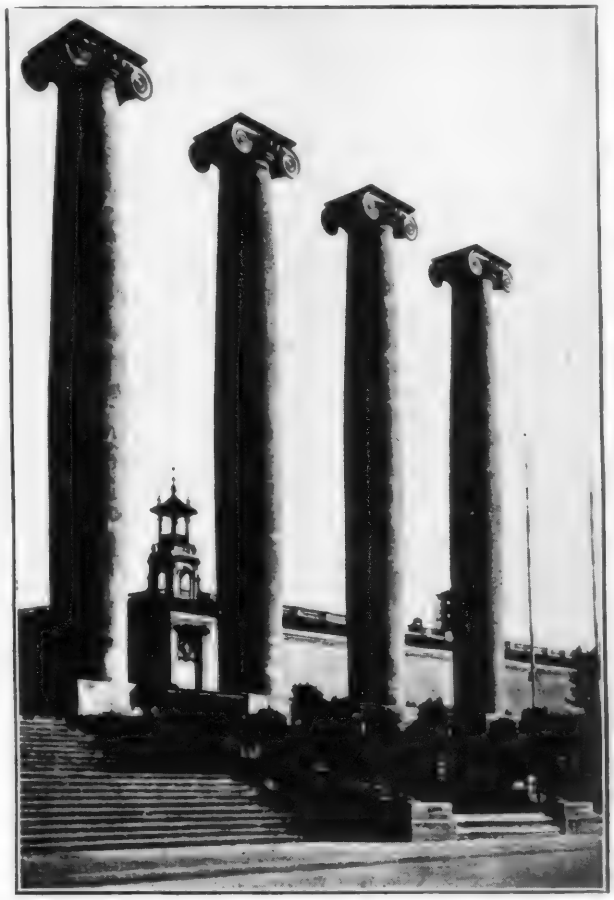
The decision to hold the 1930 National Convention in Chicago, which twice has demonstrated its ability to draw a much larger attendance than any other city in the entire country, was made by the Committee on Location of Convention, meeting at Washington, D.C., last month.

Chinese Eggs.

In view of the revelations that have been made about the conditions under which egg collection is carried out in China, we should not be surprised to hear that a stoppage of the importation of frozen eggs had come under consideration.



A part of the International Exhibition at Barcelona. On the opposite page is shown the entrance to the Exhibition. Both these illustrations are reproductions from a book reviewed on page 237.



OPENINGS FOR BRITISH TRADE

British firms may obtain the names and addresses of the persons or firms referred to in the following notices by applying to the Department of Overseas Trade, personally or by letter (Development and Intelligence), 35, Old Queen Street, London, S.W. 1.

Pickled Pork.—A firm of manufacturers' agents in British Guiana, who hold agencies for dry goods, hardware, and provisions, desire to obtain the representation of exporters of pickled pork in barrels, leather, and boots and shoes. (Ref. No. 38.)

Biscuits, Gin, and Cider.—A manufacturers' travelling representative who has had many years' experience in India, Burma, and Ceylon is shortly returning to the territory, and is prepared to represent British manufacturers of the above. (Ref. No. 40.)

Proprietary Foodstuffs and Medicines.—A manufacturers' agent and travelling representative who has had many years' experience in India, Burma, and Ceylon is prepared to represent British manufacturers of proprietary foodstuffs and medicines in that market. (Ref. No. 41.)

Sardines, Fancy Groceries, and Table Delicacies.—A firm of importers of fancy groceries and table delicacies (who are also wine and cordial makers) in Winnipeg desire exclusive agencies for the Prairie Provinces of Manitoba, Saskatchewan, and Alberta, the population of which is about 2,300,000, on a commission, purchase, or consignment basis, for the above-mentioned lines. (Ref. No. 47.)

Foodstuffs, Cereals, and Cattle Food.—A Swiss firm at Zurich desire to secure the representation of British exporters of all kinds of foodstuffs, cereals, and cattle food. (Ref. No. 99.)

Butchers' and Packers' Machinery, Tools, and Supplies.—The Officer-in-Charge of H.M. Trade Commissioner's office in Winnipeg reports that a company of wholesale and retail butchers in Saskatoon are desirous of getting into touch with British manufacturers of the above. (Ref. B.X. 5447.)

Cocoa Beans.—An agent in Vienna desires to secure the representation, on a commission basis, of British firms dealing in the above. (Ref. No. 49.)

Provisions.—A well-established European firm of manufacturers' agents in India, who specialise in the sale of wines, spirits, and kindred lines, and who have good connections among general merchants, clubs, army contractors, etc., are desirous of representing British manufacturers of the above lines. (Ref. No. 3.)

Hard Fats, Malt and Materials for Biscuit, Bread, Cake, and Confectionery Makers.—A firm of refiners of edible oils and manufacturers of shortening products in Montreal desire British agencies on a purchase basis for the whole of Canada for the above. (Ref. No. 560.)

Fine Provisions, etc.—An old-established cigar manufacturer and wholesale tea dealer in Neuwied desires to secure the representation, for the Rhineland and on a commission basis, of British manufacturers of the above. (Ref. No. 21.)

Coffee.—An agent of good standing in Madrid wishes to get into touch with a British exporter of coffee with a view to acting as his representative in Spain. (Ref. No. 569.)

Food Lines Suitable for Grocery and Allied Trades.—A firm in Auckland manufacturing a food product, and having surplus factory accommodation, could undertake storage, packing, and marketing, if desired, of English food lines suitable for grocery and allied trades. Inquiries should be addressed to W. B., Trade and Produce Branch, High Commissioner for New Zealand, 415, Strand, London.

Pharmaceutical Products or Patent Foodstuffs.—An agent in Cologne-Ehrenfeld desires to secure the representation, for the Rhineland and Westphalia, and on a commission basis, of British manufacturers of the above. (Ref. No. 548.)

Provisions; Patent Medicines.—Agent in Amsterdam desires to secure the representation, on a commission basis, of British manufacturers of the above. (Ref. No. 95.)

Products for use in the Chocolate, Confectionery, Biscuit, and Pastry-making Industries (excepting Butter).—A commission agent established at Brussels is desirous of obtaining the representation of British manufacturers of the above-mentioned goods. Correspondence may be in English. (Ref. No. 91.)

Food Products and Edible Oils.—A Toronto firm of brokers and agents for food products desire British agencies on a commission or consignment basis for the whole of Canada for such products and for edible oils. (Ref. No. 81.)

Spices, Jams, Raisins, Bottled and Canned Cherries.—A newly established firm of manufacturers' agents in Ottawa desire British agencies on a commission basis for the Provinces of Ontario and Quebec for the above. (Ref. No. 83.)

Enquiries and Correspondence

[*Interested readers will be put in touch with the enquirers.*]

57. "We should be glad to learn the addresses of actual manufacturers (not agents) of glass lemonade barrels fitted with tops, and glass stoppers, either at home or abroad."

58. Wanted: Manufacturers of a machine for slicing and coring apples to make jam.

59. We should be glad if you could put us in touch with the supplier of a recipe for the manufacture of what the Americans call "Sweet Pickle." In appearance this pickle is like any other mixed pickle, but to the vinegar in which it is packed is added some sweet flavouring substance.

Lacquered Containers

To the Editor.

SIR,

I was interested to read Mr. E. J. Norton's letter in the July issue commenting on my claim that lacquers are made, or can be made, for all food products packed in tin containers.

I was careful to use the words "can be made" because there are probably some food products still to be tested in lacquered tins.

As far, however, as this country is concerned lacquers are used with every success for all fruits and vegetables grown here, also for fish, meat, meat and fish pastes, salad oil, pickles, butter, dripping, and many other eatables. Certain foodstuffs are cooked and sterilised in the can, having to be subjected to temperatures up to 250° F., which the lacquer must resist. In other cases the pack may be boiled for two to five hours, again a severe test for lacquer. In some instances the lacquered plate has been "drawn" on "tooled," and the lacquer must stand this severe test in addition to the subsequent cooking given. It is this "drawing" process that sometimes causes a lacquered container to set up corrosion or hydrogen-swell. But this is not primarily the fault of the lacquer. It is because the lacquer film has been stretched beyond its limit of elasticity and its protective nature thereby weakened.

If, also, a lacquered film is scratched or broken a breach is made in the protective barrier between the tin and the foodstuffs, through which the chemical action between them and the tin takes place.

It is a fact that such action is often severer than if the tin had not been lacquered at all, but this is no fault of the lacquer, but due entirely to faulty methods of application of the lacquer or careless treatment of the tinplate after lacquering.

Important tests have been made by using cans that have been spray lacquered after making up, thus avoiding any risk of scratches on, or fracture of, the protective film. These tests showed that after twenty months the contents of the cans were in perfect condition and the surface of the lacquer film absolutely untouched. Lacquered closures have been removed after two years, including six months under tropical conditions, with the film intact and in perfect condition. Lacquered tin sheets have been immersed in vinegar and tomato purée for six months, a fairly severe test, without any action on the film whatever.

The instances quoted by Mr. Norton from American practice mention pumpkins, corn, and beets. The two former are not grown in this country and the last has not been canned to any great extent in England yet, but lacquer has already been used successfully for beets here. The Americans developed a special lacquer for corn some years ago which has been very successful. The Americans call this lacquer "enamel"; the ordinary gold lacquer for fruits they describe as "sanitary" lacquer, a description which would not be very acceptable in this country owing to other associations.

I cannot understand why they should have any difficulty with asparagus, string beans, cherries, and greengages. It is a well-known fact, however, that fruit canners in America are much more troubled with hydrogen-swell than English fruit canners. Much of the foreign fruit and tomatoes is packed in unlacquered cans, and the contents cannot be compared with British packs for colour or flavour.

Now the vast majority of English fruit canners use a lacquered can, which partly explains the difference. There are, however, I understand, other reasons connected with the fruit itself and methods of treatment, canning, etc., which is a matter I am not competent to discuss. No doubt Mr. F. Hirst could enlighten us on these points. I do wish, however, to emphasise the fact that a very much larger proportion of English canned fruits and foodstuffs is packed in lacquered cans than is the case abroad. English canners certainly would not continue to pack in lacquered cans if results did not abundantly justify the extra cost involved.

I am afraid I cannot accept Mr. Norton's American instances as having any particular bearing on British practice and experience, and although I thank him for his contribution, I remain unrepentant under his criticism.

I would, however, like to add this in conclusion. To guarantee success with a lacquered can it is essential to—

(*a*) Use the right lacquer for the job;
(*b*) see that the tinplate is clean and free from grease;
(*c*) correctly apply and correctly stove the lacquer;
(*d*) avoid scratches and fractures during the manufacture of the container;
(*e*) do not make up container for at least twelve hours after lacquering;
(*f*) give two coats of lacquer.

There are many other essentials necessary to insure a first-class job, but these are the most vital. If all these conditions are faithfully complied with I see no reason why *all* food products should not be successfully packed in lacquered containers, even those American ones referred to by Mr. Norton, which evidently give trouble in the States.

I am, etc.,

A. LL. MATTHISON.

Books Reviewed

Barcelona. C. O. Justh. Albertus Verlag. Augsburg, Joh. Haagstr. 16. 224 pp. (9 ins. by 6 ins.) M.20.

The present Barcelona International Exhibition gives the appearance of this book an especial interest. Prefaced by five pages devoted to notes of historical general interest, it contains over 200 magnificent reproductions of every place of interest, two examples of which are reproduced on another page. In themselves works of art, they will form a valuable memento to the innumerable visitors from this country to the Exhibition, at which British manufacturers are represented. To those who contemplate visiting Barcelona in this connection, the plan of the town that is included will be of assistance. The book is one of a series, *Das Gesicht der Städte*, devoted to the great industrial centres of the world. The volume dealing with the Ruhr district was reviewed in our June issue.

Glue and Gelatine. P. I. Smith. Pitman. 8s. 6d.

In his preface the author states that he has attempted to treat the subject of glue and gelatine from the point of view of the glue manufacturer, the tanner, the chemist, and the general consumer.

The book will appeal chiefly to the manufacturer and those desiring a general knowledge of the preparation of gelatine from the raw materials. These raw materials are dealt with in some detail, and the important question of preservation of offal stock, both by the tanner and the glue manufacturer, receives attention. The filtration, evaporation, and drying of gelatine is also dealt with as fully as can be expected in a book of this size.

To the chemist, particularly the food chemist, the book is disappointing. Much space given to elementary chemistry could be omitted. Extracts from standard authors are quoted extensively, perhaps rather too much so, rendering the narrative disjointed and rather difficult to read.

Arsenic in Gelatine.

Considerable space is given to the analysis of glue and gelatine, and the methods given are reliable. Insufficient mention is made, however, of the necessity of looking for arsenic. Gelatine should always be examined for arsenic in the food laboratory as a matter of routine, and a method of tasting would have been useful. In water analysis temporary and permanent hardness may be determined more satisfactorily by the use of standard soap solution than by titration of the alkalinity.

To the food manufacturer, one of the most important tests is that of jelly strength. This is dismissed very shortly, the method given being of no practical use for jelly strengths of the gelatine solutions used by food manufacturers. The clarity of gelatine solutions, also very important to the food manufacturer, also is not dealt with, and an account of the effect of such factors as pH, calcium content of ash, nature of the water used, temperature treatment, etc., on the clarity of gelatine solutions would have been a valuable addition to the book. It is not generally realised the effect that pH has on both the set and clarity of gelatine solutions, the best of gelatines becoming cloudy near the iso-electric point.

Gelatine in Food.

The account of the applications of both glue and gelatine is interesting and comprehensive. The use of gelatine, however, as a thickening agent in jams and jellies is very slight. Gelatine in pharmacy is dealt with fully, and the book concludes with an interesting chapter on the use of gelatine in the photographic industry.

The author has succeeded very creditably in his attempt to give a general account of the manufacture and uses of gelatine, and the book should be useful to those requiring a general treatment of the subject without going into great detail.

A. C. J.

Books Received

Bacteriology. Tanner. Chapman and Hall. 22s. 6d.
Critical Studies in Legal Chemistry of Foods. Brooks. Chemical Catalogue Company, New York. $6.
Cellulose Lacquers. Smith. Pitman. 7s. 6d.
Dairy Bacteriology. Hammer. Chapman and Hall. 25s.
Medical and Scientific Catalogue. Lewis. 7s. 6d.
Allen's Commercial Organic Analysis. Vol. VII. Alkaloids. 5th edition. Churchill. 30s.

Patents and Trade Marks.—Any of our readers requiring information and advice respecting Patents, Trade Marks, or Designs should apply to Rayner and Co., Patent Agents, of 5, Chancery Lane, London, who will give free advice to readers mentioning Food Manufacture.

Current Literature

Fruit and Vegetable Products.

423. Zinc Contents of principal Vegetable Foodstuffs. Bertrand and Benzon. (*Bull. Soc. Chim.*, 45, 168-175.)

424. The Resistance of Cans to the Attack of the Preserved Goods. Owe. (*Det Kgl. Norske Videnskabers Selskabs Skrifter*, 1926, 4, Supp., 83. pp.)

425. Work on Grape Products. (*Canner*, 69, 1, 32-38.)

426. Coagulation of Colloids from Beet Sugar Liquors. Gundermann. (*Chem. Z.*, 53, 305-307.)

427. Preservative Principles of Hops. Hastings and Walker. (*J. Inst. Brew.*, 35, 229-233.)

428. Proximate Composition of Fresh Fruits. Chatfield and McLaughlin. (U.S. Dept. Agric. Circ. 50, 1-19.)

429. The Commercial Utility of Cherries. (*Braunschw. Kons. Z.*, 1929, 27, 5-6.)

430. The Effect of Sulphur Dioxide on the Oxidase of Fruits. Cruess and Fong. (*Fruit Prod. Jour.*, 8, 10, 21.)

431. Effect of Storage on Vitamins of Canned Foods. (*Canner*, 68, 26, 17.)

432. Frozen Pack Method of Storing Berries. Diehl and Hawkins. (*Ice and Refrig.*, 76, 6, 497-498.)

433. The Spontaneous Decomposition of Sugar Cane Molasses. Browne. (*Planter and Sug. Man.*, 82, 26, 503-4.)

434. Furfural and Diastase in Heated Honey. Lampitt, Hughes, and Rooke. (*Analyst*, 54 640, 381-395.)

435. Sugar Factory Filter Cloths. Sandera. (*Z. Zuckerind. Czechoslov.*, 53, 321-329.)

436. Elimination of Colloidal Matter from Beet Juices. Brown. (*Sugar Press*, 13, 14-15.)

437. De Vecchis' Process for Extracting Sugar from Beet. Giordano. (*Giorn. Chim. Ind. Appl.*, 11, 155-163.)

Cereal Products.

438. Colorimetric Determination of Ergot in Flour. Okoloff. (*Z. Unters. Lebensm.*, 57, 63-71.)

439. Determination of Ergot in Flour by a Serological Method. Okoloff and Akimoff. (*Ibid.*, 72-76.)

440. The Rôle of Moisture in Wheat and Flour. Fairbrother. (*Ind. Chem.*, 5, 53, 243-245.)

441. Spots in Bread. (*Nat. Baker*, 3, 7, 131.)

442. Electrolytic Conductivity of Aqueous Extracts of Flour. Schmorl. (*Z. ges. Mühlenwesen*, 5, 62-65, 88-90, 126-127.)

443. Flour Quality: Its Nature and Control. Fisher. (Nat. Ind. Council for Flour-Milling Ind. Pamphlet No. 3, 56 pp.)

444. Starch and Protein in Barley. Lorch and Staehler. (*Allg. Brau. Hopf. Z.*, 1929, 229.)

445. Correlation Studies with Diverse Strains of Spring and Winter Wheats. Inheritance of Quality. Hayes, Immer, and Bailey. (*Cereal Chem.*, 6, 85-96.)

446. Determination of Starch in Cereals and Mill Products. Von Scheele and Svensson. (*Tekn. Tidschr.*, 58, 57-60.)

447. Hydrogen-Ion Determination in Flour and Bakery Products. Whittier and Grewe. (*Cereal Chem.*, 6, 3, 153-161.)

448. Modification of Rumsey's Method for the Determination of Diastatic Activity in Flour. Malloch. (*Ibid.*, 175-181.)

449. Granulation of Flour and its Relation to Baking Quality. Kress. (*Ibid.*, 202-214.)

450. Carotinoid Pigments of Flour. Ferrari and Bailey. (*Ibid.*, 218-240.)

451. A Quick Viscosimetric Method for Measuring the Staleness in Bread. Karacsonyi. (*Ibid.*, 241-243.)

Dairy Products.

452. The Refraction of Milks Low in Solids-not-fat. Elsdon and Stubbs. (*Analyst*, 639, 318-320.)

453. Factors Affecting the Yield and Quantity of Milk—I. The Age of the Cow. Kay and McCandlish. (*J. Agric. Sci.*, 19, 342-372.)

454. A Rapid Method of Analysis of Butter. Charliers. (*Chim. et Ind.*, May, 931-936.)

455. Spray Drying and the Drying of Dairy Products. Nyrop. (*J. Soc. Chem. and Ind.*, 48, 24, T.136-139.)

456. Test for Vitamin A in Margarine, Butter, and other Fatty Foods. Anderson and Nightingale. (*Ibid.*, T.139-140.)

457. Effect of Lecithin in Dairy Products on Butter Fat Determinations. Chapman. (*J. Dairy Sci.*, 11, 429-435.)

458. Separation of the Components of Frozen Milk by Fractional Melting. Winter. (*Chem. News*, 138, 321-324.)

459. F.p. of Milk. Van Raalte. (*Anal.*, 54, 266-268.)

460. Bacterial Content and Keeping Quality of Milk. Barkworth, Meanwell, and Taylor. (*J. Min. Agric.*, 36, 170-173.)

461. Wastage in Dairy Herds. Variation According to Season of Calving.

462. The Effect of Pasteurisation and Cooling of Milk on the Quality of Cheddar Cheese. Marguardt. (*Hansen's Dairy Bull.*, 14, 5-6.)

463. Electrical Conductivity of Milk—I. Detection of Abnormal Milk from Diseased Cows. Krenn. (*Z. Unters. Lebensm.*, 57, 148-177.)

464. Rapid Analysis of Butter. Charliers. (*Chim. et Ind.*, 21, 931-936.)

Various.

465. Specific Colour Reagent for Ergosterol. Rosenheim. (*Biochem. J.*, 23, 47-53.)

466. Vitamin Content of Honey. Hoyle. (*Ibid.*, 54-60.)

467. Vitamin D and Resistance of Chickens to Parasitism. Eckert and Spindler. (*Amer. J. Hyg.*, 9, 292.)

468. Scientific Aspects of Packaging and Quick-Freezing Perishable Flesh Products. Birdseye. (*Ind. and Eng. Chem.*, 21, 6, 573-576.)

469. Honey in the Glass Container. Barnard. (*Glass Container*, 8, 8, 5-7.)

470. Bottled Beverages. Jones. (*Ibid.*, 13-16.)

471. Protection from Contamination. Nevell. (*Grocery*, 31, 6, 429-431.)

472. The Effect of the Composition of the Mix. Hahn. (*Ice-Cream Ind.*, 4, 3, 10-11.)

473. Modern Malting Methods. Chabot. (*Woch. Brau.*, 46, 208-211.)

474. Chemical Detection of Vitamin. Glassmann and Posdeev. (*Z. Unters. Lebensm.*, 57, 191-200.)

475. How to Avoid Fat Floating. Wesley. (*Conf. Jour.*, 645, 76-78.)

Analysis.

476. The Detection of the Prohibited Vegetable and Coal Tar Colour in Foodstuffs. Nicholls. (*Anal.* 639, 335.)

477. Manganese in Foodstuffs. Newcomb and Sankaran. (*Indian J. Med. Res.*, 1929, 16.)

478. Determination of Starch Syrup and Dextrose in Presence of Sucrose and Invert Sugar. Kruishur (*Chem. Weekblad*, 26, 254-263.)

479. Detection of Adulterants in Cacao Butter by Oxidation with Perbenzoic Acid. Bodendorf. (*Pharm. Z.*, 74, 384-385.)

480. Colloid Chemistry in Relation to Sugar Manufacture. Bergé. (*Bull. Soc. Chim. Belg.*, 38, 31-46.)

481. Analysis of Egg-paste. Settimj. (*Annali Chim. Appl.*, 19, 182-188.)

482. Copper Content of Plant and Animal Foods. Lindow, Elvehjem, and Peterson. (*J. Biol. Chem.*, 82, 465-471.)

483. Composition of Spinach Fat. Speer, Wise, and Hart. (*Ibid.*, 105-110.)

Commercial and Legal News

(The Editor does not accept responsibility for any errors which may occur in the following notices.)

London Gazette Information

Joint Stock Companies.

The names of the undermentioned companies have been struck off the register, and are dissolved:

New Sudbury Dairy Company, Limited.
Stogumber Brewery Company, Limited.
California Canneries Company, Limited.
Mincing Lane Bottling Company, Limited.
Polish Bacon Company, Limited.

Reduction of Capital.

Grain Union, Limited, and reduced. The Order of the High Court, Chancery Division, dated June 12, 1929, confirming the reduction of the capital of the above-named company from £500,000 to £179,840, and the minute approved by the Court showing with respect to the share capital of the company as altered the several particulars required by the Companies (Consolidation) Act, 1908, were registered by the Registrar of Companies on June 20, 1929.

Voluntary Liquidations.

(Note.—Voluntary liquidations may, in some instances, refer to companies in course of reconstruction.)

Alsace-Lorraine and General Products Company, Limited. Resolved, June 15, that the company be wound up voluntarily, and that Mr. A. H. Partridge, 3, Warwick Court, Gray's Inn, W.C. 1, be appointed liquidator.

Table Specialities, Limited. Resolved, June 27, that the company be wound up voluntarily, and that Mr. H. Overton, C.A., 50, Cherry Street, Birmingham, be appointed liquidator.

Chilmington Farm Dairies, Limited. Resolved, June 10, that the company be wound up voluntarily, and that Mr. F. Neate, of Bank Street, Ashford, and Mr. S. E. Foster, I.A., Ashford, be appointed liquidators.

Gelatine Manufacturing Company, Limited (in voluntary liquidation). A general meeting of the members of this company will be held at the offices of Messrs. Hubbart, Durose, and Pain, Atlantic House, 46, Holborn Viaduct, E.C., on August 12, at 11 a.m., to receive the report of the liquidator showing how the winding-up has been conducted. Liquidator, Mr. E. L. Donald.

Robinson's Brewery, Limited (in voluntary liquidation). A general meeting of the members of this company will be held at the registered office of the company in Union Street, Burton-on-Trent, on September 18, at 4 p.m., for the purpose of receiving the liquidator's report showing how the winding-up has been conducted.

Partnership Dissolved.

T. Lighton and Sons (E. Lighton, G. Lighton, and W. Lighton), mineral water manufacturers, Ashgate Road, Chesterfield. Partnership dissolved as from July 1, 1929. Debts by E. Lighton and G. Lighton, who continue the business.

Pectin Case

In the Court of Appeal

The Master of the Rolls and Lords Justice Lawrence and Russell, in the Court of Appeal on July 18, concluded the hearing of an appeal by the Douglas Packing Company (Inc.) and the Douglas Pectin Corporation, of Rochester, New York State, from the decision of Mr. Justice Romer in the Chancery Division, dismissing their action against William Evans and Company (Hereford and Devon), Limited, of Widemarsh, Hereford, for alleged infringement of their patents for the improved manufacture of pectous compounds used in jam and jelly making. The defence was a denial of the alleged infringement, and it was contended that plaintiffs' patents were invalid because of prior user and common general knowledge.

Mr. Justice Romer said the first of plaintiffs' patents economised time and expense and preserved the colour of fruits. No such compound had before been produced, and it was a great success commercially. He held that the first patent was valid, but plaintiffs had not shown that defendants had infringed it. The second patent was to remove turpidity caused by starch, and he held this was bad for want of subject matter. He gave defendants two thirds of the general costs of the action.

The present appeal was limited to the decision with regard to the second patent.

On the application of Mr. S. Cripps, K.C., on behalf of the appellants, the court allowed the Postum Corporation to be added as parties to the proceedings, they having acquired the rights of the plaintiffs in the action.

After arguments by counsel on each side an order by consent was made.

Leave was given to the appellants to apply to the Comptroller for rectification of the specification of the patent to which the appeal related. The court discharged the order of Mr. Justice Romer so far as it ordered the action to be dismissed and so far as it dealt with the costs. An injunction was granted restraining the defendants from infringing the third claim of the patent specification, also an inquiry as to damages was ordered and a certificate was granted as to the validity of the patent. The court also ordered that there should be no costs either in the Court of Appeal or in the court below. The question of the costs of the inquiry as to the damages was reserved.

New Companies

Dee and Son, Limited. (239259.) 24-27, Rood Lane, E.C. 3. To carry on the bus. of grocers, provision mchts., etc. Nom. Cap.: £2,000.

Thomas Lightbound and Sons (1929), Limited. (239305.) 1, Tinsley Street, Liverpool. To take over the bus. of bakers and millers cd. on at 169, Walton Breck Road, and elsewhere in Liverpool, as "Thomas Lightbound and Sons, Limited. Nom. Cap.: £500.

M. AND J. JOHNSON, LIMITED. (239312.) 241, Cross Lane, Salford. To carry on the bus. of confectioners, pastrycooks, etc. Nom. Cap.: £200.

BREWHURST MILLING COMPANY, LIMITED. (239337.) 22, Bedford Row, W.C. 1. To carry on the bus. of millers, corn, cake, flour, offals, and seed mchts., etc. Nom. Cap.: £1,500.

LIVE STOCK AND BUTCHERS, LIMITED. (239345.) 38, Holborn Viaduct, E.C. 1. To carry on bus. as indicated by the title. Nom. Cap.: £3,000.

MALKINS, LIMITED. (239407.) To carry on the bus. of tea, coffee, and provision mchts. Nom. Cap.: £500.

JOHN SPICER, LIMITED. (239743.) 3-4, Paul's Bakehouse Court, E.C. 4. To carry on the bus. of grocers, fruiterers, and greengrocers, etc. Nom. Cap.: £10,000.

S. W. ALEXANDER, LIMITED. (239805.) 10, Maids of Honour Parade, Richmond, Surrey. To carry on the bus. of ham and beef retailers, etc. Nom. Cap.: £1,000.

S. SANSBURY AND COMPANY, LIMITED. (239831.) 86, Gloucester Road, Brighton. To carry on the bus. of wholesale fruit, vegetable, and potato mchts., etc. Nom. Cap.: £1,000.

C. AND P. WILSON, LIMITED. (239843.) 37 and 38, The Wholesale Market, Leicester. To carry on the bus. of fruit and produce mchts. formerly cd. on at Leicester by P. P. Wilson. Nom. Cap.: £4,000.

TUCKETTS, LIMITED. (239893.) Bishops Place, Millbay, Plymouth. To take over the bus. of wholesale and retail confectioners cd. on at Plymouth and elsewhere as "Tucketts." Nom. Cap.: £90,000.

DULCIA, LIMITED. (239902.) 140-146, Cambridge Road, Hackney, E. To carry on the bus. of mnfrs. and purveyors of provisions, etc. Nom. Cap.: £1,000.

ROBINS STORES (LONDON), LIMITED. (239913.) To take over the bus. of grocers and provision mchts., and wine, spirit, and beer dlrs. cd. on by Robins Stores, Limited, and the assets of the vendors in connection therewith, etc.. Nom. Cap.: £25,000.

JAMAICA PRODUCERS MARKETING COMPANY, LIMITED. (F.2809.) 37-38, Long Acre, W.C. 2. Incorpd. in Jamaica. To enter into agmts. with the Jamaica Banana Producers Association, Limited, for the marketing of bananas to be marketed in Great Britain, Ireland, Europe, and elsewhere; to act as agents for the growers of any Jamaica products, etc. Nom. Cap.: £100,000.

NOEL Y COMPANIA, LIMITADA. (F.2814.) 9, Clements Lane, E.C. 2. Incorpd. in the Argentine. To manufacture, import, and export preserves, sweetmeats, etc. Nom. Cap.: $5,000,000.

Name of person authorised to accept service:

J. A. Robertson, 9, Clements Lane, E.C. 2.

M. ANDRÉ ET CIE., LIMITED. (239937.) Coleshill Road, Sutton Coldfield. To take over the bus. of a chocolatier, confiseur, and café proprietor cd. on at Sutton Coldfield as "M. André et Cie." Nom. Cap.: £35,000.

A. S. CHAPMAN (LONDON), LIMITED. (239952.) 229, Oxford Street, W. 1. To carry on the bus. of licensed victuallers, wine, spirit, ale and beer merchants, etc. Nom. Cap.: £10,000.

ASSOCIATED GROCERS' (SUNDERLAND), LIMITED. (240057.) To carry on bus. as indicated by the title. Nom. Cap.: £2,000.

BUCKS EGG PRODUCERS, LIMITED. (240075.) Chartridge House, Chesham, Bucks. To carry on bus. as indicated by the title. Nom. Cap. £1,000.

GLANMOOR SUPPLY STORES, LIMITED. (240085.) Albert Buildings, 151-157, Fitzwilliam Street, Sheffield. To carry on the bus. of food providers, confectioners, bakers, etc. Nom. Cap.: £100.

TREASURE HOUSE, LIMITED. (240098.) To take over the bus. of a confectioner and café and restaurant proprietor and licensed victualler cd. on at 9, Chapel Street, and 3, Ely Street, Stratford-on-Avon, together with the property and assets and the beer and wine licence held in connection therewith, etc. Nom. Cap.: £3,000.

PREPARED FOODS, LIMITED. (240125.) To carry on the bus. of mnfg. provisioners, sausage and pie mnfrs., etc. Nom. Cap.: £100.

FOODSTUFFS, LIMITED. (240283.) Haunch Lane, Kings Heath, Birmingham. To carry on bus. as purveyors of meat, etc. Nom. Cap.: £1,000.

B. M. GARDNER AND SON, LIMITED. (240510.) St. Magnus House, 25, Monument Street, E.C. 3. To enter into an agreement with the International Development Company, Limited, and to carry on the bus. of general merchants, importers, exporters, and packers of and dlrs. in provisions of all kinds, including dried, fresh, and canned fruits, etc. Nom. Cap.: £5,000.

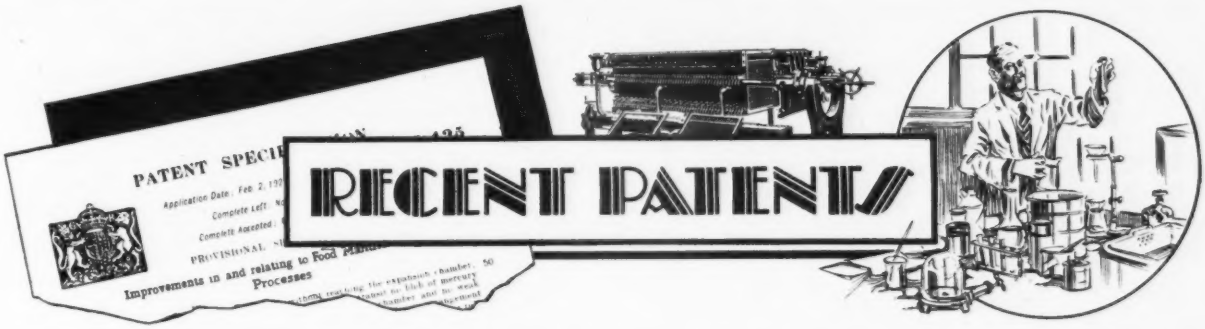
ST. AUSTELL BAY HOTEL COMPANY, LIMITED. (240560.) Cross Lane, St. Austell. To carry on the bus. of hotel, restaurant, café, and beerhouse keepers, licensed victuallers, etc. Nom. Cap.: £40,000.

J. BENNETT, JUNR., LIMITED. (240577.) To take over the bus. of wholesale fish dealers now cd. on at Billingsgate Market, E.C. Nom. Cap.: £10,000.

DEACONS (NORWICH), LIMITED. (240592.) To take over the bus. of fish and poultry merchants, etc., cd. on at 2, St. Stephen's Plain, Norwich. Nom. Cap.: £5,000.

F. BALLANCE, LIMITED. (240595.) To take over the bus. of grocers and provision mchts. cd. on at High Street, Stratford-on-Avon, as "F. Ballance." Nom. Cap.: £10,000.

PROSSOR AND ECKFORD, LIMITED. (240810.) To take over the bus. cd. on at Planet Street, Cardiff, and/or elsewhere as "Prosser and Eckford," and to carry on the bus. of wholesale and retail grocers, general provision mchts., etc. Nom. Cap.: £4,000.



These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents," and are published by permission of the Controller of H.M. Stationery Office.

Latest Patent Applications

19349. BROOKE, A. F.: Manufacture of pectin. June 24.

20276. BEATTIE, A., and LYON, A. A.: Treatment of eggs. July 2.

20435. COW AND GATE, LIMITED, and GATES, W. R. B. ST. J., and TAVROGES, J.: Dry milk products. July 3.

20616. HAMAKERS, C. R., and LOWDEN, H. W., and LOWDEN AND HAMAKERS: Treatment of cane, etc., sugar juices. July 5.

20722. BURGESS LABORATORIES, INC. C.F.: Fermentation of sugars. July 5.

Specifications Published

291,764. CANADA SUGAR REFINING COMPANY, LIMITED: Regulators actuated by fluid pressure.

299,061. RUBBER CULTUUR MAATSCHAPPIJ AMSTERDAM: Treatment of palm fruit.

313,979. SCHLECK, E.: Processes for improving corn.

314,273. GREEN, C. H.: Method and means for preserving eggs.

314,364. FALKINER, R. S.: Treatment of sugar cane.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. *each.*

Abstracts Published

309,836. **Milk, etc., food preparations.** KLEINE, C. W. A., 95, St., Eriksgatan, Stockholm.

For making a stable homogenised milk or cream-like emulsion, or an emulsion of either the fat-in-solution or the solution-in-fat type, the whole of the solution and fat is first transformed into a basic emulsion which is well agitated and is then immediately homogenised. The basic emulsion may be produced at a temperature below 73° C. or at as low a temperature as the freezing-point of the fat will allow, the fat being gradually added to milk in an emulsifier. In making a solution-in-fat emulsion the solution is gradually added to the fat in an emulsifier.

309,932. **Sterilising cream.** GRASSE, S., Dumfrosk, Corrour Road, Newlands, Glasgow.

309,976. **Distilling, etc.** GRIFFITHS, H., 15, New Bridge Street, London.

307,167. **Butter, margarine, etc.** NYROP, J. E., 36, Vimmelskaftet, Copenhagen.

Preserving butter, margarine, and like emulsions.—The process of the parent Specification is applied to butter, margarine, and similar water-in-oil or oil-in-water emulsions having a small content of casein or other protective substance. Products of a paste-like consistency are obtained, and on kneading with water these products will absorb the water to form or reproduce a substance of butter-like nature.

307,854. **Pasteurising and sterilising liquids.** NIELSEN, N. J., 15, Frederiksgade, Aarhus, Denmark.

308,031. **Sugar.** KOMERS, K., 40, Stepanska, Prague, and CUKER, K., Tavikovice, Moravia, both in Czecho-Slovakia.

Purifying saccharine liquids.—Diffused sugar syrup is purified by a temporary oxidation by means of air at ordinary or slightly elevated temperatures, whereby a dark coloration is produced. The syrup may be led over a screen to insure complete contact with the air or the air may be blown through the syrup for a few minutes. The dark coloration is removed by the addition of bases such as lime or other calcium salts, care being taken to avoid the decomposition of the precipitate by excess of lime. Superphosphate may also be used for precipitation, in which case, after removal of the precipitate, the syrup is rendered basic with lime. The steps are repeated until darkening no longer results on oxidation.

306,881. **Vitamins.** SHIMIZU, T., 43, Yobancho, Okayama, Japan.

Vitamin A is extracted from suitable materials, such as egg yolk, cod-liver oil, tomato, spinach, and green algæ, by removing cholesterol and the like from the unsaponifiable portion, and precipitating the vitamin as a choleic acid from which the free vitamin may be obtained. In an example, cod-liver oil is saponified with alcoholic potash and alcoholic solution of an alkaline earth salt, such as calcium chloride, is added, the precipitated alkaline earth soaps being removed

The filtrate is treated with an acid such as carbonic acid to convert any free inorganic base into insoluble salts, such as carbonates or bicarbonates, which are removed. The alcohol is then evaporated, and the residue dissolved in a solvent immiscible with water such as acetic ester, benzene, or ether. The solution is washed with soda, trisodium phosphate, etc., to remove acids, then with water or dilute acids such as hydrochloric or sulphuric acid, and is then evaporated to remove the solvent. The oily, partly crystalline residue is dissolved in a small quantity of an organic solvent, such as methyl or ethyl alcohol, acetone, or ethyl acetate and cooled to crystallise out cholesterol. The mother-liquor is evaporated and the dark brown oil which separates is dissolved in a suitable solvent, such as methyl or ethyl alcohol or acetone, and desoxycholic acid or other like acid adapted to form choleic acids (such as apocholic or bufodesoxycholic acid) is added. To cause the separation of a choleic acid the solution may be heated or evaporated and taken up in the same solvent, repeatedly if necessary. Water is added with stirring until the fluorescence disappears and the solution remains clear when warm. On cooling, the vitamin A choleic acid crystallises, the mother-liquor containing other vitamins such as D and E which may be recovered from it. The crystals are allowed to stand in contact with ether, chloroform, or the like to purify them, and have the empirical formula $(C_{24}H_{40}O_4)_5,C_{27}H_{44}O_2H_2O$. To obtain the free vitamin, the choleic acid may be boiled with a large excess of a substance which forms a choleic acid, such as xylol, acetic acid, or a fatty acid. On cooling the xylol choleic acid crystallises out. The mother-liquor is freed from xylol by evaporation and the residue is taken up in the methyl or ethyl alcohol, acetone, esters, etc. On evaporation, the vitamin separates in white needles of the formula $C_{27}H_{44}O_2$. Alternatively, the choleic acid may be distilled at 250° C. in a high vacuum, the distillate being dissolved in a small quantity of a solvent such as alcohol and the solution concentrated and allowed to crystallise. The crystals of the vitamin A choleic acid and of the free vitamin A are relatively stable to oxygen, but the process is effected in absence of free oxygen for instance in a nitrogen atmosphere.

308,324. **Yeast.** SAK, S., 5, Gefion's Plads, Copenhagen.

A process for producing yeast, with or without the production of alcohol, consists in maintaining for a desired time interval a constant relation between the weight of yeast and weight of sugar or other added nutrient, by controlled additions or withdrawals of yeast to or from the fermenting wort. The yeast added may be obtained from another fermenting wort, or may be developed outside the process, or it may be centrifuged yeast. When obtained by centrifuging yeasty wort obtained from the fermenting wort, it can be returned to any vat wherein the ratio by weight of yeast to sugar, etc., is maintained. The separated yeast-free wort can be returned to the fermenting wort. Ammonium, calcium, and magnesium compounds, phosphates and sulphuric acids are employed as auxiliary nutrients. Specifications 294,123 and 294,134 are referred to.

308,390. **Treating flour with radiations.** BONSOR, S., 173, Church Hill Road, Handsworth, Birmingham.

308,405. **Margarine, butter, etc.; alkali lactates.** BOEHRINGER, A., Nieder-Ingelheim-on-Rhine, Germany.

For improving the keeping quality of margarine, butter, etc., and to develop and improve the aroma thereof, commercially pure alkali lactates are incorporated, such lactates having been prepared or treated so that the amount of volatile acids contained therein does not exceed 0·5 per cent. and is preferably below 0·25 per cent.; or buffer solutions of lactic acid and lactates not containing detrimental quantities of volatile acids may be used in place of the alkali lactates. Suitable alkali lactate can be obtained by allowing calcium or magnesium lactate to crystallise and then using the first crop of crystals for the manufacture of the alkali lactate. Iron in the lactate should be removed as by precipitating it with sodium sulphide, excess sodium sulphide being removed with oxidising agents such as chlorine, hydrogen peroxide, etc., avoiding excess.

308,436. **Bakers' ovens.** PAULETT, H., 11, Lodge Buildings, Ystalyfera, Swansea.

308,469. **Confectionery.** KREMMLING, O., Kreis Oschersleben, Hamersleben, Germany.

Coating bakers' and confectioners' goods; rotary brushes.—In a brushing-machine for coating, glazing, brushing, and otherwise treating edible wares such as confectionery and sweetmeats, a rotary or band brush is used which is reciprocated transversely to the direction of the feed movement of the confections, or, alternatively, the conveyor may be reciprocated or moved bodily in a circular or elliptical path, these movements being superimposed on the general feeding movement.

Recent Trade Marks

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491,415. **Figs.** ARAM HAMPARZUM, Villa Fortunée, Boulevard Prince de Galles, Cimiex, Nice, France. July 3.

AIRMAN

502,027. **Chocolate biscuits.** CADBURY BROTHERS, LIMITED, Bourneville, Birmingham. July 3.

SILVER PRINCE

502,602. **Flour.** KIRBY'S (SELBY), LIMITED, Imperial Flour Mills, Barlby Road, Selby. July 3.

502,806. **Illustration of a top hat and the words TOP HAT BRAND. Fresh, preserved, or dried fruits.** DELAGOA PLANTATIONS, LIMITED, Magude via Lourenço Marques, Portuguese East Africa. July 10.